



The Magazine for Information Executives

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wireless



unhyped

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Look around. You're in the midst of a global maelstrom. A swirling mass of converging technologies and new business opportunities unleashed by the Internet. All waiting to be harnessed by companies like Fujitsu – the world's third largest IT services provider.* We've focused our energy and

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WHAT DO YOU DREAM?
WHEN YOU OPEN YOUR MIND TO THE
FULL POTENTIAL OF THE INTERNET,
WHAT DO YOU SEE?

resources on creating technology to solve the unique problems of thousands of individual businesses. Last year alone we invested \$4 billion of our

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*Source: IDC, December 1999. *Who Will be Leading the Global IT Services Industry in 2000?*: A Competitive Analysis by Mauro Peres, Sophie Janne Mayo.

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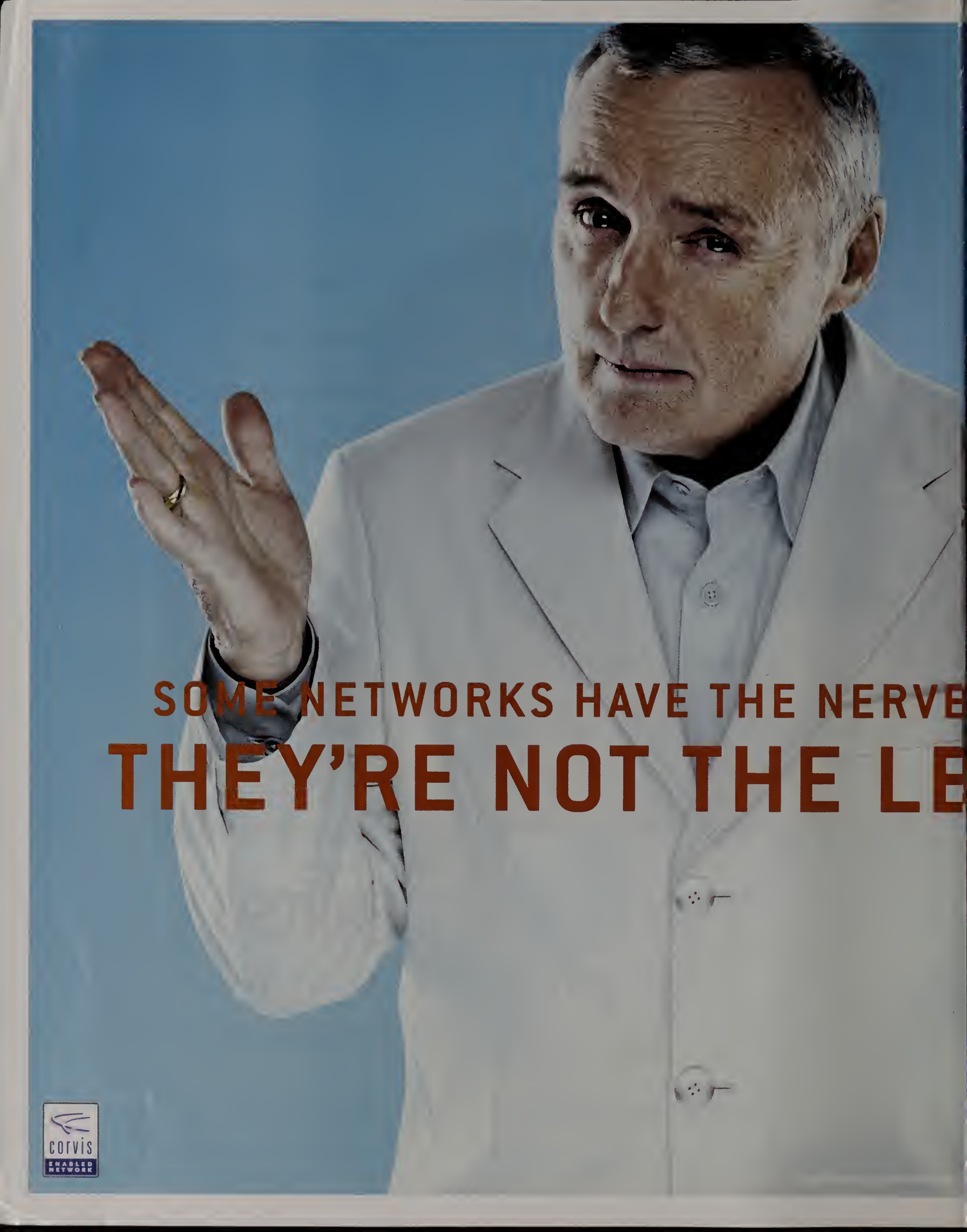
speeds up to 1.7 Terabits per second. That's fast enough to send

20 million simultaneous phone and Internet calls down a single

hair-thin optical fiber. Our photonic technology provides the boundless

multimedia capacity Internet users before could only dream of.

And it's merely one part of our total telecommunications expertise.

A man with short, graying hair, wearing a white suit jacket over a light blue button-down shirt, is shown from the chest up. He is gesturing with his right hand, palm facing forward, with fingers slightly spread. He has a gold ring on his ring finger. The background is a solid, light blue color.

**SOME NETWORKS HAVE THE NERVE
THEY'RE NOT THE LE**





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GLOSSARY A list of terms to help you understand the most important wireless technologies, standards and devices.

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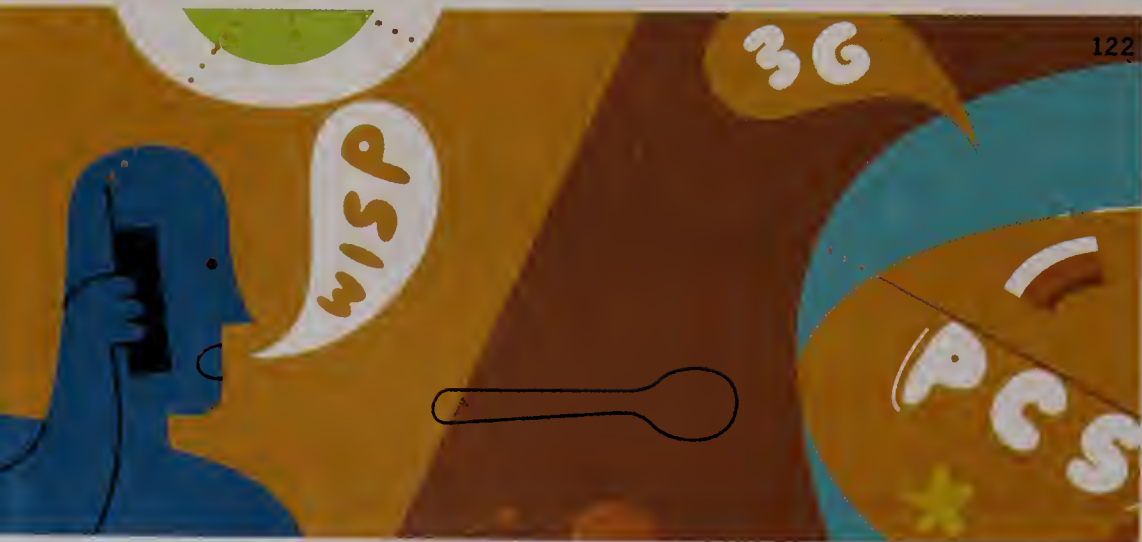
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To put it simply: as goes infrastructure, so goes the enterprise. In today's economy, all the ingenious products, brilliant marketing and champion deal closers won't amount to a heck of a lot if you can't connect to your outside suppliers, if the network crashes or the databases fail (and all you can say to customers is, "Sorry, the computers are down; can you call us back tomorrow?").

Planning, building and maintaining e-business infrastructure is about hard questions: What platforms should I use? How do I plan for the unexpected? Will it grow when we grow? Will it work with new technology in the future? Will it build

upon my current systems? Can I link to my customers' and suppliers' systems? I've heard about open standards, but what can they do for my business? What about outsourcing? How do I finance all of this?

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So, unless you are able to turn botched infrastructure attempts into fabulously profitable tourist attractions, call us at 800 426 7080 (ask for infrastructure) or visit us at ibm.com/e-business for our latest white paper on e-business infrastructure. The sooner, of course, the better.



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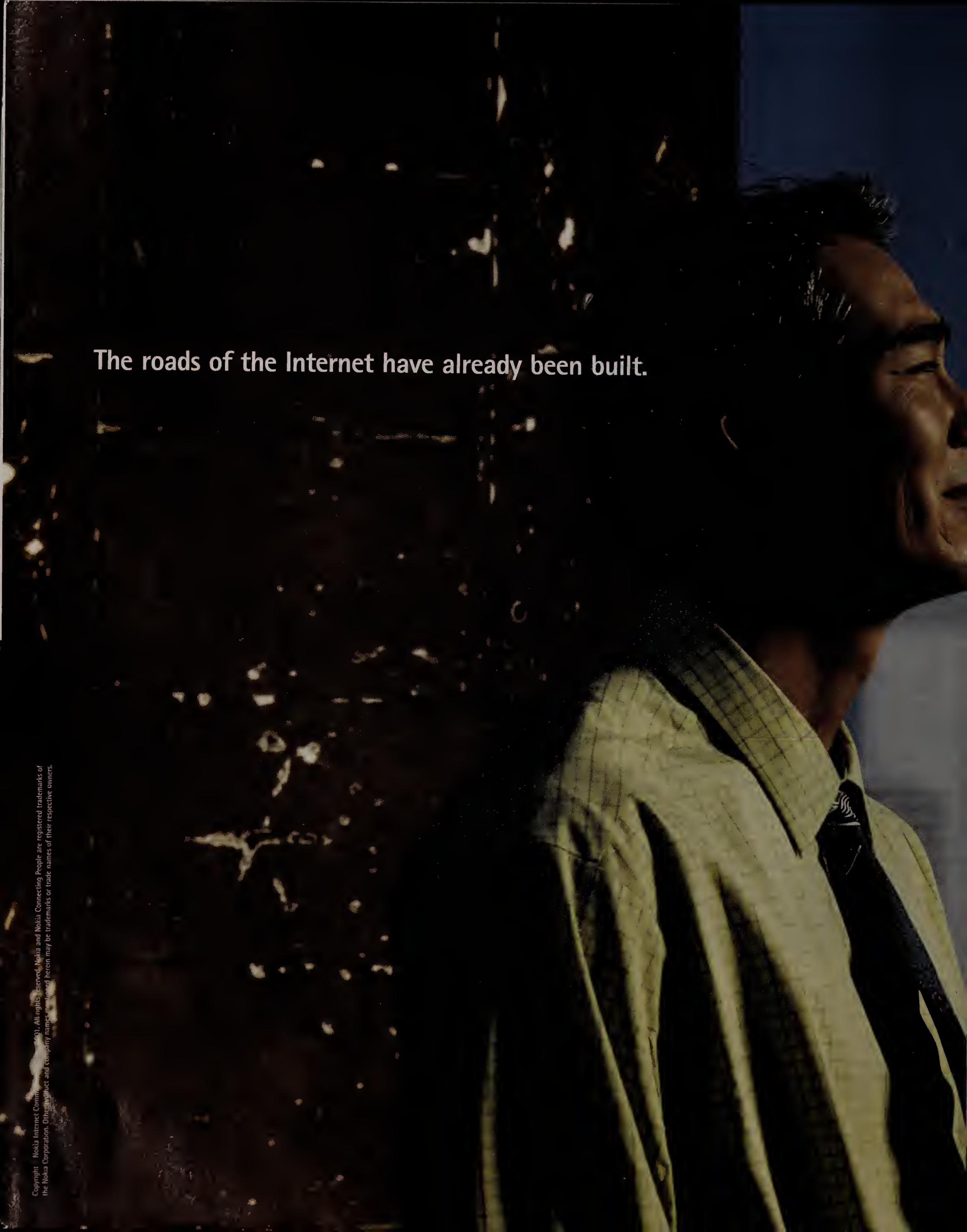
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Where documents are going

A man in a light-colored suit and dark tie is shown from the chest up, looking upwards and to the right. The background is a dark, starry night sky with many small, bright stars. The lighting is soft, highlighting the man's face and suit.

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Ken Segarnick on Technology Policy

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QUICK POLL:

BEHIND THE NUMBERS

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Does your CEO get IT?

Each week, we pose a question to CIO readers and report the results of the previous week's poll. Learn where your fellow executives stand on IT's most pressing issues.

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“If you don't have a strong, honest and open relationship with your current CEO, then a career move is a must in any case.”

—Korn/Ferry International's Mark Polansky giving a reader advice on Executive Career Counselor

www.cio.com/forums/executive/counselor.html



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That's why information technology executives from all over the world come together each year for three days at Pebble Beach, California, to attend Candle Corporation's CIO Executive Exchange and share ideas about solving today's business and technology challenges.

In fact, three-quarters of our attendees come back year after year, seeking the opportunity to network with their peers and learn more about the business issues that are key to their strategic planning.

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- ▶ Executives will explore new ways to deliver, automate and manage critical business services, and industry analysts will lend their perspectives to all discussions.
- ▶ For more information and to find out how to register, visit www.candle.com/cio2001 or contact Evan Wolf at (310) 727-4160.



Candle

eBusiness at the speed of light™

A stylized illustration. In the upper right, a person in a dark suit stands next to a large tree with green leaves. The background is a solid light blue. In the foreground, a field of large, stylized, smiling faces in various shades of blue and green is visible. The faces have simple, curved lines for eyes and mouths, giving them a happy expression. The overall style is minimalist and modern.

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InBox

Reader Feedback

LETTERS FROM THE FIELD

I read "Field Report: A Passage to India" [Dec. 1, 2000] with interest. As a person from the south of India who came to the United States for further education, I see a lot of change back home. India is a land of contradictions, but underneath it all is a new blend of IT professionals who are trying their best, given our weak infrastructure, to move forward.

What is lamentable is that while Indian IT training is the cheapest and the most effective in the world, Indian IT professionals are leaving for better pastures outside their homeland. Although fascination with the dollar has taken many great brains out of the country, India's government is now luring them back with the improvements in infrastructure planned with the new Tidel Park in Chennai and the valiant efforts of the chief minister of the state of Andhra Pradesh. In fact, Internet browsing centers and cybercafes are now all over the country, and everyone is talking about the Internet. In that respect, India is well on its way toward joining the "Ivy League" of advanced IT nations.

Ram Arthanari • E-Business Application Developer • Prophet 21 • Philadelphia • ram126@email.com

The greatest contradiction that India presents is that it has not been able to convert its potential into reality. India has all it takes and more: A world-class education system (the Indian Institutes of Technology and the Indian Institutes of Management produce the best engineering and management brains in the country), the natural skill that Indians have (generally speaking) in English and in mathematics, their propensity to work hard in spite of tremendous obstacles or hardships (be it riding the insufferable trains in Bombay to work or waiting in endless bus queues in Delhi)—all speak to Indians' resilience and desire to excel.

What prevents this potential from being converted into reality are the country's political landscape and the dithering that goes on over investments in basic infrastructure such as transportation, electricity, telephones, roads and bridges. Though India has made great strides in telecommunications, it has light years to go to right

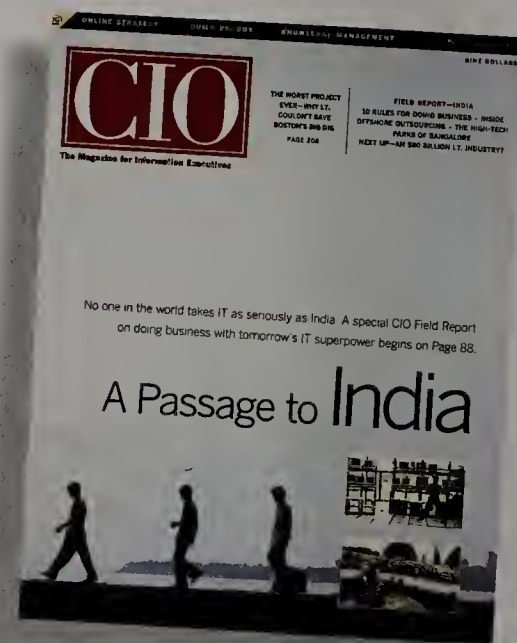
the wrongs of several weak, profligate governments that have persisted in throwing good money after bad (and lining their own pockets). The burden of an ever-growing population and the yawning gap between basic resources demanded and those supplied also remain barriers to fulfilling and realizing the potential of the nation.

The achievements of India in IT are just the tip of an iceberg. If India's political class can pull up its socks and get some of the basics right, the country's bottled potential could be let out. However, this won't happen overnight. An increasingly demanding populace, industrialists insisting on a fair playing field (rather than courting select political groups to get favors) and an ideology based on being competitive in world trade are what's needed to set India apart from the rest.

Raghunath Hariharan
London Business School
London

rhariharan.mba2002@london.edu

I have more than just a passing interest in India's IT industry, as I am the director of business development at a company that operates a software services company in the Philippines and offers offshore IT solutions to companies in the United States. Indian IT companies are our biggest competi-



tors (and everyone else's), and I can tell you from firsthand experience about the inroads they have made into the IT departments of U.S. corporations. As I market my company's services, however, I run across many CIOs who tell me about their experiences outsourcing to India. Their remarks run about half and half as to good and bad experiences, which is about the same percentage they report when they tell me about their experiences with U.S.-based IT service companies.

Cary Weltken
Director of Business Development
SVI America
San Francisco
cweltken@sviamerica.com



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mobile business

E-Commerce: The Sell Side of B-to-B Is a Matter of Survival

Lightning-fast advances in Internet technologies have made e-commerce an absolute necessity for dot-coms and brick and mortar businesses alike. At stake are hundreds of billions of dollars' worth of e-commerce transactions. Executives at all levels of the corporation are asking simply, "Are we ready?"

The direct answer is, "It depends." So you need to ask the right questions. How do packaged e-commerce solutions stack up to customized approaches? How tough is it to tie the Web front-end to back office systems? How ready is the existing infrastructure for e-commerce? Should you incorporate mobile commerce into your business model?

Join Unisys experts, clients, partners and industry analysts as they examine these questions in a Webcast on March 27, 2001 at 11am EST. Structured as part seminar, part panel discussion and part Q&A, this 45 minute Webcast will help you determine which e-commerce solutions best meet your business needs and provide the greatest return on your investment. For more information and to register for the Webcast, visit www.unisys.com/e-biz/Webcasts.

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InBox

The caption to a photograph of two Infosys Technologies employees on Page 184 of "A Passage to India" states that the women are "clad in traditional saris." They are actually wearing versions of a "salwaar kameez," also called a "Punjabi suit" (because it originated in India's Northern Punjab region). That garment is not part of southern India's traditional attire, but because of cross-cultural influences between northern and southern India, it is now accepted

nations of the world. And with cheap labor rates and people who are willing to work numerous hours to get the job done, India is in the running to become an IT powerhouse.

The only problem I see is that India's rich cultural diversity can't be penetrated by American society. As American companies extend their business relations with companies in India, it is imperative that they understand the culture that is so much a part of India. However, the average

In order for American companies to succeed in the Indian market, they need to recruit Indians.

in most southern cities as a suitable garment for young women.

The photograph attests, not to the meeting of tradition (sari) and modernity (computer), but to the fact that the development of IT in India is being accompanied by the development of a pan-Indian identity, in which computer programming languages help India's people communicate across language, religious and regional divides.

Urmila Mohan
Web Designer

Transworld Information Systems

Iselin, N.J.

urmila_mohan@yahoo.com

After reading "A Passage to India," I believe that I have an answer to the question "Where will India be in another nine years?"

Because of the high levels of poverty and the high levels of corruption that dwell within the foundations of India it is very possible that India could become a country consumed by political strife and internal warfare. I believe, however, that India has the potential to become one of the leading

Caucasian American is not able to understand India's cultural diversity and traditions.

In order for American companies to succeed in the Indian market, they need to recruit Indians who have been born and raised in America who can act as liaisons. These people are often referred to as the new "IndoPak generation," because they combine proficiency in the languages of both countries, communication skills, an old cultural heritage and the new American know-how.

S. Adam Ghazi
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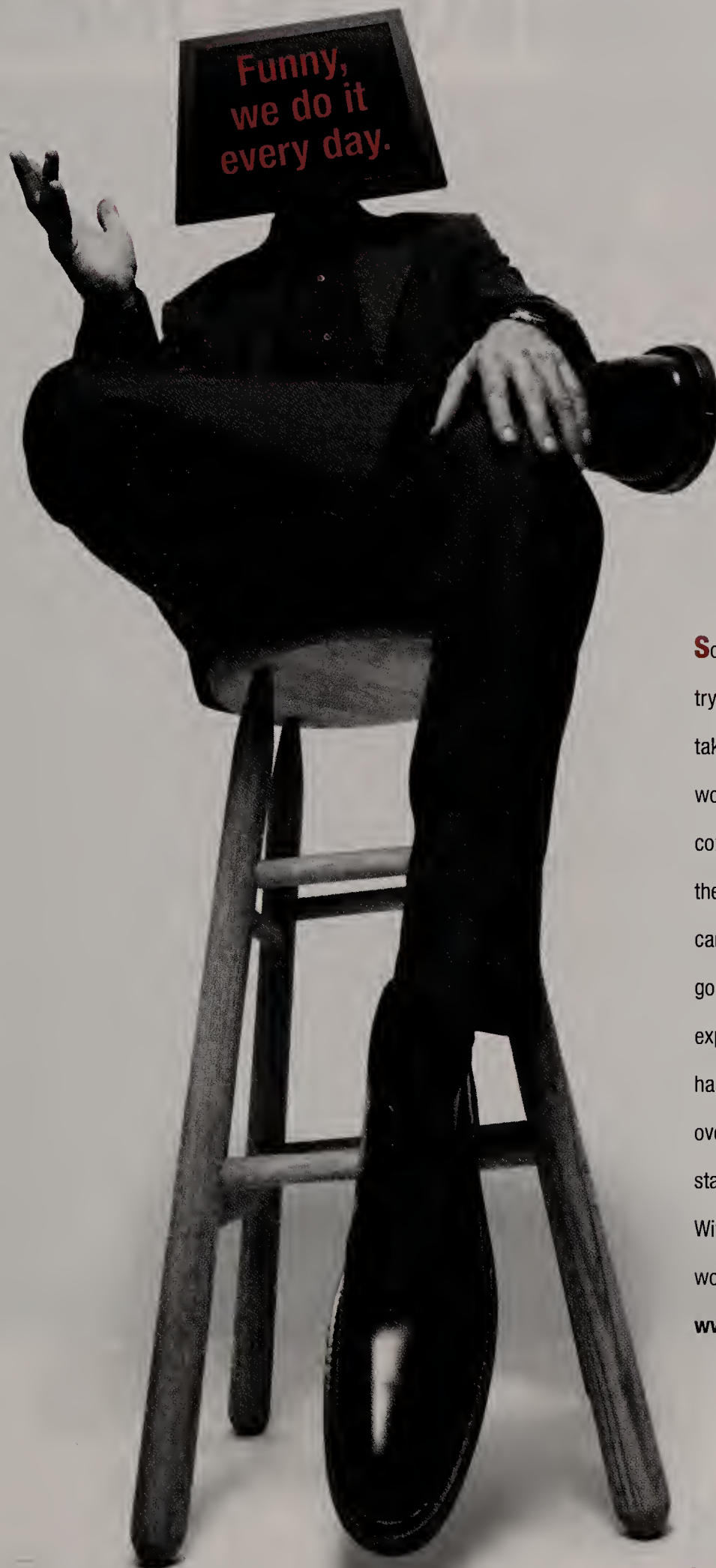
CORRECTION

In "Clicklayer" (Feb. 1, 2001), we misspelled Procter & Gamble. We apologize for the error.

WHAT DO YOU THINK?

Send your thoughts and feedback to letters@cio.com. Letters may be edited for length or clarity.

They say, in **e-business**, it takes forever to unify the past with the future.



Some e-business consultants will tell you trying to integrate your legacy systems takes too long and costs too much. They would have you scrap what exists and commit to whatever vision of the future they're selling that day. Unisys people can unify what you have with what you're going to need, using our decades of experience, ingenuity, and plain old hard work. And we do it every day, in over 100 countries. Today is the day to start unifying your past with the future. With Unisys people there to help, it won't take forever. Visit our website at www.aheadforebusiness.com.

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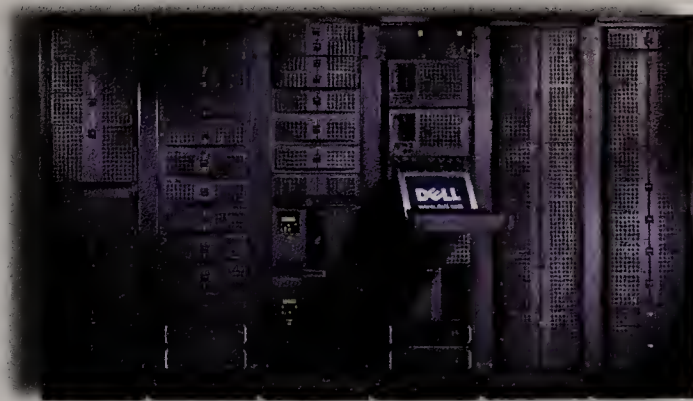
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Collaborate to Cure

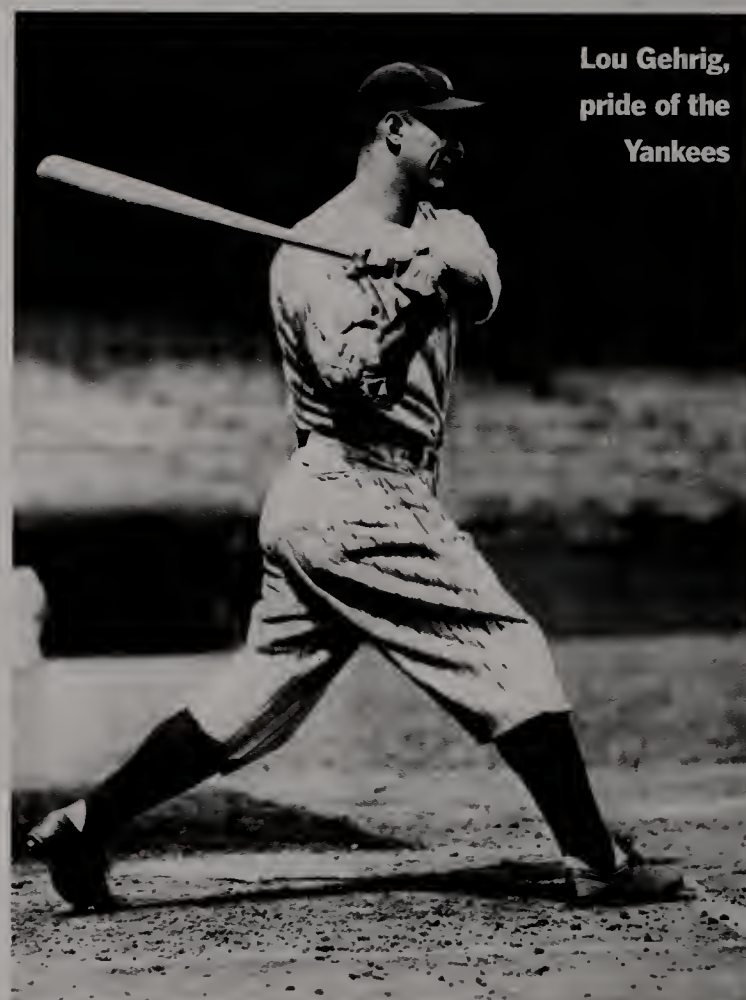
By Matt Villano

WHEN JAMES HEYWOOD'S brother developed amyotrophic lateral sclerosis (ALS), or Lou Gehrig's disease, two years ago, Heywood looked to the Internet to learn more about the debilitating disease. After months of Web searches, however, he concluded that the ALS community was spread too thin. Scientists posted positive findings but produced no therapies and conducted good research but sponsored little development. As Heywood saw it, doctors needed IT to bring them together to coordinate their efforts.

In December 1998, from the basement of his home in Newton, Mass., Heywood formed a nonprofit group called the ALS Therapy Development Foundation, vowing to use technology to connect the people who had the best chances to cure the disease. When Microsoft Project proved

inefficient, Heywood sought an alternate product. This led him to San Diego-based Inovie Software, a developer that discounted its Team-Center business collaboration tool to help facilitate the organization's efforts.

Written in C and C++, it works almost like a project management suite, enabling scientists to exchange research, schedule online meetings and message each other in a chatlike environment. It offers e-mail notification when someone publishes new findings, and it can also be configured as a Web portal that displays the latest ALS news. Heywood says the technology is the perfect enabler for the



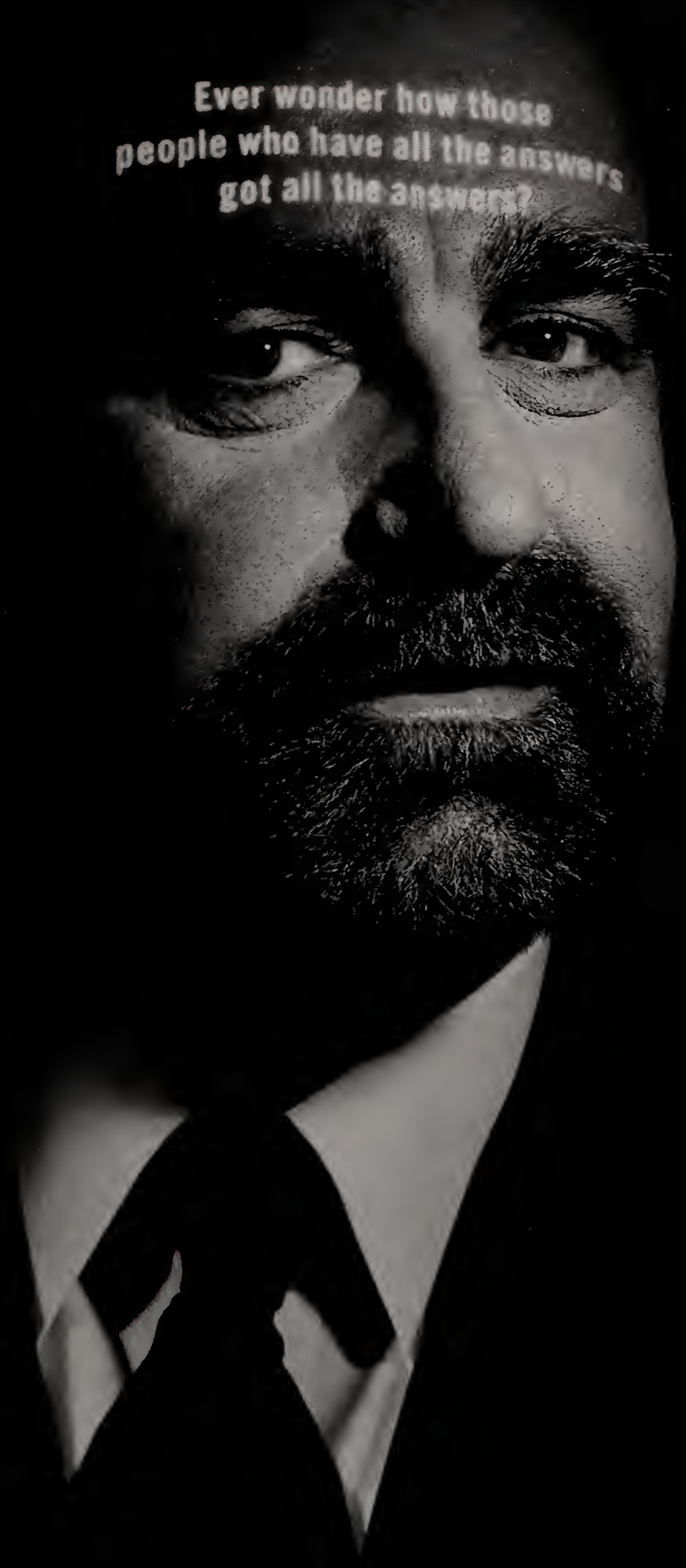
Lou Gehrig,
pride of the
Yankees

kind of community he envisions. "When you're conducting real-time work from multiple locations, technology like this is critical," he explains.

Heywood isn't the only one who's been pleasantly surprised. At Inovie, Vice President of Marketing Evan Knuttila says the company has received tremendous positive feedback because of its ALS effort. Knuttila hopes the technology can help facilitate a cure for the disease, which helps keep Heywood optimistic: "I expected to be more depressed about my brother's prospects, but I'm not," he reveals. "I honestly believe it's possible to beat this. With technology on our side, I'd say it's just a matter of time." For more information about ALS, visit www.als-tdf.org.

Department of **BIG,** Scary Numbers

92.8: percent of respondents saying a lack of communication skills is an issue in their IT organizations **\$80.9 BILLION:** infrastructure spending by online marketplaces by 2005 **\$42 BILLION:** global revenue from wireless broadband services by 2005 **\$5.4 BILLION:** forecast for value of global KM software market in 2004 Sources: Jupiter Research, Metriqnet, IDC, The ARC Group



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Taking Customers Cereally

OUR FRIEND ADAM looks forward to visiting us in New England in late June because for a brief time the stars align to make The Triple Treasure a breakfast possibility. The homemade concoction mixes three cereals (whatever's on the shelf) with freshly picked strawberries, blueberries and raspberries. Bland, cross-country shipped

All this came to mind recently when we heard some CRM news from General Mills. The Minneapolis-based food giant has begun testing a new consumer program and website that lets people create their own cereal blends and mixes.

Chex and Kix, with dried fruit and nuts, and order the custom blend online. With General Mills' vast array of cereals and add-ins, the possible combinations exceed 1 million, says Greg Zimprich, a senior PR manager at General Mills.

Consider the possibilities: Count Chocula, Cocoa Puffs and Nesquik cereals together. Or mix Frankenberry, Trix, Kaboom and Lucky Charms!

Once a tester picks her blend, General Mills assembles it using a secret process and ships one serving that arrives two to four days later. The price runs \$1 per serving. “We hope to gain valuable consumer insight into trends in taste and health and nutrition patterns, [while] evaluating the effectiveness of a variety of different marketing levers,” Zimprich says.

So far General Mills hasn't set a date for wider availability of the program, so it looks like we're still on our own for The Triple Treasure. (For more on customization, see Page 36.)

Maynard

BY DARRIN BELL AND THERON HEIR



Does your network keep your company and its suppliers
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Washington Watch

Edited by Elana Varon

Any Safe Harbor?

COMPANIES WITH European subsidiaries can shield themselves from privacy-related lawsuits under a "safe harbor" agreement negotiated between the United States and the European Union (EU) last summer. The pact lets U.S. businesses send personnel and customer data stateside, an exception to EU rules that prohibit transfer of personal information to any country that doesn't follow Europe's stringent privacy laws.

Businesses that join the pact (which is voluntary) agree to follow the EU's Directive on Data Privacy, which says they can share only info they collect with other companies if the subject of the data consents. In return, Europeans unhappy with how U.S. companies use their data have to sue in U.S. courts under privacy laws that are less stringent than Europe's. Businesses that decide not to join risk having European governments prohibit them from sending data back home. **Jeff Rohlmeier**, an international trade specialist with the U.S. Department of Commerce (DOC), says the agreement was needed to prevent disrupting \$350 billion in trade with Europe, which is now mostly conducted electronically.

So far only 13 companies have signed the pact. The reason isn't clear. Companies appear to be procrastinating because the agreement isn't currently being enforced. That's likely to change later this year, when the EU will decide whether to seek even stricter rules.

Whether or not a company signs on, it still has to build systems that comply with the EU's privacy standards in each European country where they handle personal data, says lawyer **Catriona**

Hatton, whose practice in the Brussels office of Hogan & Hartson focuses on EU antitrust law and regulatory affairs.

At press time, the Bush administration hadn't taken a position on the pact. Meanwhile, CIOs can keep tabs on future negotiations through the DOC (www.doc.gov). —Joe Kendall

Holding Pattern

THE DRUMBEAT FROM consumers about protecting privacy online is amplifying the political rhetoric in Congress. How long before talk turns into action?

Sen. Ron Wyden (D-Ore.), an e-commerce advocate, predicts Congress will pass a privacy bill this year. According to his Chief of Staff

Josh Karden, Wyden thinks the feds need to act before state legislatures under pressure from their constituents enact rules about what customer

info companies can share. The result: 50 different data privacy laws that might require companies to treat customer data differently depending on where those customers live.

Eying this possible patchwork of state laws, some companies are rethinking their opposition to federal rules. In January, the American Electronics Assoc., which represents over 3,500 companies and had been against a national privacy law, reversed itself, joining consumer-

oriented groups like the Consumers Union and the Consumer Federation of America. But that doesn't mean a bill can get passed. At least one influential business group, the U.S. Chamber of Commerce,

still wants the feds to keep their hands off. **Rick Lane**, the group's director of e-commerce and Internet technology, says there's no privacy problem: "When you say show us the harm, there are no vic-



Billy Tauzin

tims." And plenty of politicians including the new chairman of the House Commerce Committee, **Rep. Billy Tauzin (R-La.)**, are in the laissez-faire camp for now. Tauzin's spokesman, **Ken Johnson**, says Tauzin won't meddle as long as he thinks companies are trying to do the right thing.

So, without a crisis, Congress will keep studying the issue. "During the next couple of years there will be an intense set of hearings and discussions," says Andrew Shen, policy analyst with the proconsumer Electronic Privacy Information Center. That gives CIOs who are becoming the guardians of data privacy plenty of opportunities to let their representatives know what they think ought to be done.

—J. Kendall

Should there be a federal privacy law? Let Senior Editor Elana Varon know at evaron@cio.com. Editorial Assistant Joe Kendall can be reached at jkendall@cio.com.



Ron Wyden

"We are dependent upon computers to a degree that no other nation in the world is, thus information warfare against the United States becomes a possibility to be exploited by others."

—James Schlesinger, former CIA director, Defense and Energy secretary

The KNOWLEDGE Imperative

Success in today's global, interconnected economy springs from the fast and efficient exchange of information. Sustainable competitive advantage is no longer rooted in physical assets and financial capital, but in effective channeling of intellectual capital. The market value of a commercial enterprise is derived not only from its physical and financial assets, but from the intangible assets it creates through knowledge-based activities.

These intangible assets include intellectual property, such as patents and copyrights, as well as the more nebulous assets such as methodologies, practices and customer relationships. These intangible assets are often estimated to be worth many times the book value of a firm. According to renowned economist John Kendrick, in 1929, the ratio of intangible business capital to tangible business capital was 30 to 70. In 1990, the ratio was 63 to 37.

What is Knowledge Management?

Gartner Group defines knowledge management as a discipline that promotes an integrated approach to identifying, capturing, evaluating, retrieving and sharing enterprise information assets. Gartner re-



ILLUSTRATION BY DAVID C. CHEN

searchers believe that by 2003, intellectual capital will be the primary way in which businesses measure their value. At most corporations, knowledge becomes embedded not only in documents and information repositories, but in organizational routines, practices and conventions. Knowledge management is the process of gathering that knowledge and making it available to others.

Knowledge management isn't new. Aristotle's twelve-volume *Metaphysics* was largely concerned with demonstrative knowledge—an attempt at understanding why things happen the way they do. He was one of the first philosophers to consider the abstract nature of metaphysical reasoning, insisting that we must think not only about knowledge per se, but about the processes we employ in our search for truth.

There is a lesson here for today's business leaders as well. Knowledge is largely tacit and resident in people's heads, yet most organizations do not enforce the process of making it explicit. Even as the Internet has fuelled a data and information glut, increasing globalization has led to a scattered enterprise in which knowledge is dispersed and information is difficult to aggregate. Telecommuting and virtual offices deter physical collaboration even further. And although computer networks have become ubiquitous, they are designed to connect people to structured information, while the content generated out of human interactions is largely unstructured.

A recent survey of 239 North



Custom Publishing
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American corporations revealed that 77 percent of respondents had no network infrastructure management solution in place, preferring instead to keep records on spreadsheets or in their heads. Increasingly, that's a risky prospect. As companies grow, knowledge becomes more dispersed, and "islands of information" become more common. Research has shown that once an organization grows beyond about 200 or 300 employees, it loses grasp of its collective knowledge. Over time, a large quantum of knowledge resides with just a few people within the organization.

Siemens confronted these issues first-

work also uses a resource planning tool to allocate and track its experts throughout the world, giving users an easy way to profile consultants, identify expert skills and discover resource availability.

Today, the knowledge management system has become the digital nervous system of the company, automated by technology that makes each consultant eager to communicate and stay up-to-date.

Building a Knowledge Strategy

If knowledge is omnipresent, as Aristotle reasoned, then knowledge management is the discipline that helps put information in the right context and perspective. Prevent-

these same principles to fleet routing and product delivery. As a leader in the business of providing integrated logistics and transportation management solutions, Ryder's main business is providing truck fleets and transportation services. However, Ryder recently realized the benefits of tapping the knowledge of its in-house experts to offer integrated logistics and transportation management solutions as well.

Ryder's knowledge management solution is based around a centralized knowledge portal that supports collaboration by employees, customers and partners. For example, if a PC manufacturer wants to optimize its distribution network, it can

tap into Ryder's knowledge base to determine how many warehouses it should have, what's the right mix of truck and air transportation, and which distribution strategies will minimize the rapid depreciation of its products. The portal demonstrates how a cross-functional team seeking the best solution for a customer's supply chain can come together online and share best practices in a virtual work-space.

As Ryder learned, the knowledge management process has four distinct steps: knowledge creation, knowledge capture, knowledge application and knowledge measurement. While knowledge creation can result in either tacit or explicit knowledge, it is the

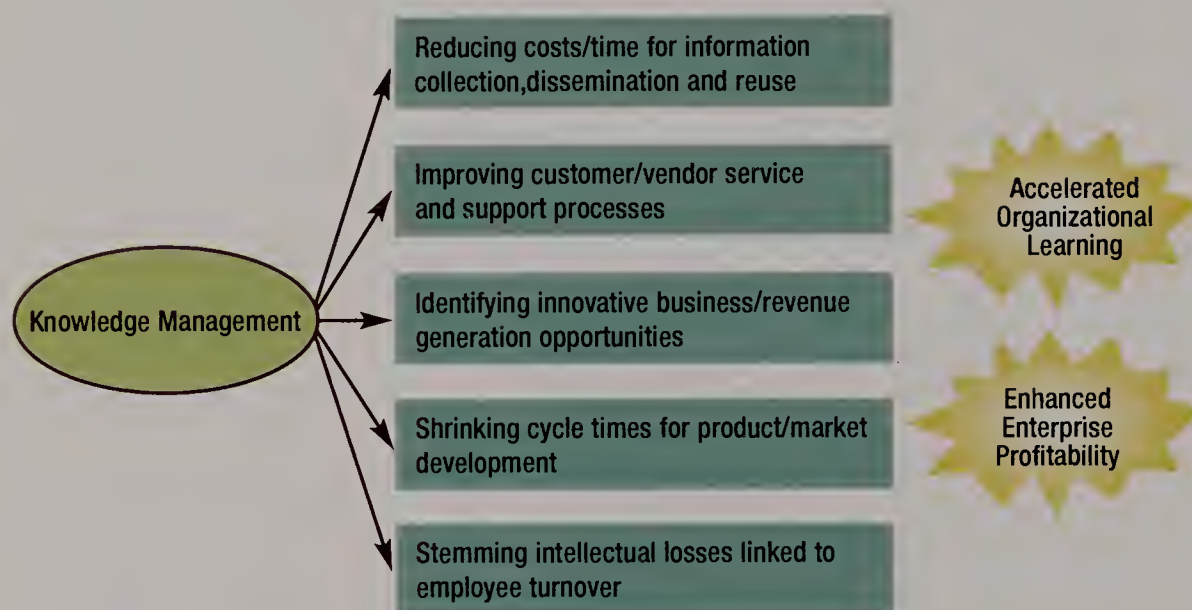
process of capturing and sharing this knowledge that makes it available across the enterprise.

Aligning Technology and Business Goals

The focus of knowledge management is not on technology per se but on instigating organizational change. "Knowledge management uses technology as an enabler," says Eric Seubert, a senior principal within Infosys Technologies - Consulting Services. "The value comes in the practices and processes that change the organizational culture and practices."

According to Seubert, real value is derived from tapping into intellectual capital and harnessing the experience of employees. "Companies need to ask themselves: How can we leverage the intellectual capital of the company to increase revenue

Knowledge management aims to enhance an organization's return on intellectual capital



Source: Infosys

hand in its struggle to keep its worldwide consulting organization informed about an ever-changing set of products and services. As one of the largest electrical engineering and electronic companies in the world, Siemens needed a system that would maintain up-to-date information on product functionality so that its consultants could review *and* record problems and solutions in one place. Trouble was, Siemens accumulated a variety of disparate communication systems that inhibited effective communication and knowledge sharing between these consultants.

The solution was the Consultant Network, a dynamic knowledge management system that unifies messaging and allows each Siemens consultant to leverage the skills and experience of all its other consultants—anytime, anywhere. This Net-

ing knowledge loss is a big factor in the knowledge management equation. Ideally, knowledge can be applied and reapplied—anywhere, any number of times—without reducing its usefulness.

The challenge comes with channeling collective learning both within the organization and among its constituents. As companies outsource more and more activities to supply chain partners, competitive advantage is dictated less by physical assets and more by intangibles such as brand equity, rate of innovation, compressed product development cycles, and sophisticated logistics. For example, being able to access a global supply base instantaneously enables manufacturers to construct, deconstruct and reconstruct a unique supply chain to satisfy each instance of demand.

Transportation companies can apply

and reduce costs," he continues. "You can put in the best IT systems, but if you can't capture learning and share knowledge, you will limit the amount of value that can be delivered to the organization."

Pfizer, the world's largest research-based pharmaceutical company, took a systematic approach to knowledge capture. In 1993, Pfizer's USA based Pharmaceuticals Group (USPG) started an exercise to integrate the company's information sources and leverage them for strategic benefits. The first step was to restructure the organization and merge the IS and Market Research departments to form a Systems and Market Research (S&MR) department to better align technology with business process requirements. Next, they built an information infrastructure that integrated internal and external sources of information and gave users intuitive access and search tools.

To ensure a proper synthesis between the business and technical requirements, cross-functional collaboration was encouraged through cross-disciplinary teams involving experts from the Medical, R&D, Marketing, Regulatory and Financial departments. These teams worked on harnessing knowledge for direct business benefits like reduced cost of health care and better patient response. Then, a sales call repository was created to help track physician level data, present a unified face to the Managed Care Organization (MCO) and improve sales force productivity.

Pfizer is now able to produce a weekly update of critical market knowledge—information that has been analyzed and cast in the company context across its 10 major drug categories. A business intelligence environment was created to further apply the knowledge, allowing Pfizer to predict trends in managed healthcare and strike partnerships with new MCOs.

"To be effective, knowledge management applications should be tied to measurable business goals and linked to overall business strategy," says Seubert. "A complete knowledge management initiative not only identifies processes for sharing intellectual capital. It also measures the results."

Tacit vs Explicit Knowledge

There are two primary types of knowledge: tacit and explicit. Tacit knowledge, resident in individuals, is typically developed from experience. It is unstructured and informal, making it difficult to communicate. Explicit knowledge is formal, structured and well documented. Thus it can easily be commu-

"These cultural and language variations were hindering communication."

Infosys worked with the CIO of the steel company to establish a conceptual plan for sharing knowledge. The initiative was centered around operational benchmarks that drive the performance of every aspect of the company. "This company

Organizational initiatives can be grouped under the three "Cs" of Culture, Collaboration and Continuous improvement



Source: Infosys

nicated. Discrete elements of explicit knowledge and information can be combined and analyzed for gaining perspective.

While both tacit and explicit knowledge can contribute to organizational knowledge creation, it is the interaction between the two that creates powerful knowledge patterns. For example, when the Consulting Services group of Infosys Technologies was engaged at one of the world's leading steel companies, the focus was on developing an IT roadmap to facilitate knowledge exchange among 12 diverse operating units. The company had grown through mergers and acquisition to establish manufacturing and marketing operations in the US, Mexico, the Caribbean, Canada, Germany, France, Ireland, Russia and Indonesia. "Twelve business units formerly operating independently were now controlled by one holding company, yet each retained its own independent culture," explains Gopi Sutar, a senior principal within Infosys Technologies - Consulting Services.

had a knack for acquiring business units that were operating at a loss and turning them around," Sutar explains. "They developed internal benchmarks to quickly identify performance gaps, but they needed help exchanging information so that flailing business units could be brought up to the internal standards."

To remedy the situation, Infosys spearheaded two knowledge management initiatives: one related to sharing tacit knowledge and the other to sharing explicit knowledge. Explicit knowledge is maintained in a centralized data warehouse that contains financial and operational performance parameters for each business unit, along with best-practice benchmarks. Every business unit has access to the warehouse and can utilize case-based reasoning tools to develop reports and analyze performance. "Business analysts use the warehouse to identify performance gaps and provide feedback to the business units about how to improve performance in those areas," Sutar says.

Tacit knowledge exchange is facilitated by intranet-based document management and Web conferencing systems that streamline communication among worldwide experts. In the past, the company held quarterly meetings where experts from each business unit met to exchange ideas. However, due to cultural and language differences, the English-speaking people tended to dominate the proceedings. By setting up a forum for holding these conferences over the Web rather than via face-to-face meetings, many people felt more comfortable expressing themselves. "We found that people were more willing to open up, even to engage in controversial discussions," Sutar says.

Today, to ensure adherence to its operational standards, periodic conferences are held to discuss specific business domains. Maintenance is a good example. "Steel manufacturing is an asset-intensive business, and maintaining those assets well is critical to attaining profitability," Sutar relates. "We're capturing best practices and helping people exchange information, particularly those who have had experience with meeting the operational standards."

The steel company is now creating global communities of experts for other business domains such as IT, procurement, marketing and logistics. In-house developers are also creating a virtual work space or "e-room" where documents can be easily exchanged. "Implementation of the data warehouse is still underway, with the lion's share of devel-

opment being performed in-house by the steel company," says Sutar. "But already the knowledge management initiatives are paying off. Even though the steel industry

agement system. This hindered communication across departments and channels, particularly since most Motorola employees were in the habit of only communicat-

"Driving and capturing individuals' exponential learning has been the key to strategic success of most intellectual enterprises, from Bell Labs to Intel to Microsoft."

— James Bryan Quinn, Prof. Emeritus, Tuck School of Business

as a whole is currently in a slump, this company is able to run a profitable operation due to its ability to effectively manage operational knowledge."

Global Best Practices

What's the take-home point for business managers? While knowledge creation patterns result in explicit knowledge, the process of knowledge capturing and sharing makes it available across the enterprise. Of course, this directive becomes progressively more difficult as an organization grows and expands, with sales, marketing and research teams spread among many different locations. For example, Motorola needed to make information about its customers available to every employee who worked with those customers—across product groups, operational divisions and time zones. The crux of the problem involved data access and delivery: The company was using a disparate mix of network protocols, email systems and a stand-alone document man-

ing exclusively with members of their own product groups.

Motorola implemented a knowledge management pilot called OneTeam to centralize information about its major customers, with a view to increasing market share. Today, OneTeam members can categorize, publish and retrieve relevant documents from public folders. The system also searches competitor Web sites and indexes that information in catalogs. This information is then emailed to the appropriate employees.

Enhancing Return on Intellectual Capital

For ages, philosophers and thinkers have wrestled with questions of epistemology: of what we know, how we learn, and how we express what we know to others. In the business world, knowledge management has arisen as a disciplined approach to managing the intellectual assets of an organization.

As businesses seek to make headway in a market where intellectual capital is as important as physical assets, channeling collective organizational learning has become one of the key challenges of the Information Age. Knowledge management aims to address this challenge by enhancing an organization's return on intellectual capital. When properly implemented, the knowledge management process encompasses the entire lifecycle—from knowledge creation to knowledge measurement.

"We help companies identify where knowledge management makes a difference for their organizations," concludes Seubert. "We look at their industries, examine the complexity of their systems and analyze their organizational dynamics. The aim is to improve the effectiveness of key business process over time. It's a journey, not an end game."•

ABOUT THE AUTHORS

As the stories in these pages illustrate, a cohesive knowledge management initiative springs from ideas—ideas that are executed with a vision for effecting organizational change. Infosys Technologies - Consulting Services is built around a core group of consultants who have put these ideas into practice within a variety of industries.

- **Eric Seubert** is a senior principal with Infosys Technologies - Consulting Services group, where he is responsible for advising clients on technology enabled-business strategies. Mr. Seubert's consulting experience consists of engagements with international and North American Fortune 1,000 companies that focused on improving performance using information technology aligned with corporate

strategic visions, business processes and organization models.

- **Y Balaji** is a senior principal with Infosys Technologies - Consulting Services group where he is responsible for advising clients on aligning IT programs with business strategies. Mr. Balaji's consulting experience consists of engagements with large, international clients in the area of corporate strategy, business planning and program management.

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THE NEXT TIME you need a break from being a CIO, test your talents as a beautician.

Riding the trend of online customization (see "Make Mine A..." this page), San Francisco-based Reflect.com (www.reflect.com) lets you create your own skin care, fragrance, makeup and hair products. You can choose your ideal cosmetics based on multiple-choice questions (Is your skin golden, olive or reddish-brown? Do you prefer lipstick that's vibrant, earthy or metallic?).

I tested out the year old site, which aims to make unique products for women—like men don't use shampoo?—and "developed" and ordered a conditioner (naming it "Divine CIO," \$17) and my own box of face cloths (titled the unimaginative "Redbox," \$18.50) after plugging in a few tidbits about my skin (fair) and hair (ash blond).

Filled with illustrations and advice from reputed beauty experts, this site is fun the first time and can of course save the formulas from your previous purchases, remember your preferences and store your favorite expert tips ("Never, ever brush wet hair—use a wide-tooth comb only"). Many have noted that soft goods are a hard sell online. Let's see what happens once aromas are digitized.

—Sarah Johnson



Make Mine A...

DELL WON FAME and glory with its made-to-order-online PCs, and these days almost everything you need for a satisfied life can be purchased the same way. Here are a few examples:

Barbie dolls www.barbie.com

Business suits www.noblesuit.com

Bicycles www.trek bikes.com or
www.fisher bikes.com

Cars www.saturnbp.com/shop_and_buy

Coffee www.igourmet.com/st_millstone.asp

Flight suits www.flitesuit.com

Funky shoes grinders.co.uk

Running shoes www.customatix.com or
www.nikeid.com

Skateboards [www.bwe.net/shredshack/
customskateboards](http://www.bwe.net/shredshack/customskateboards)

Swimsuits www.lanefour.com/turbo.htm

W I R E L E S S

Ads Up

TIRED OF ALL those pop-up ads when you surf the Web from your desktop? Too bad.

As part of a trial that began this past December, New York City-based Internet ad aggregator DoubleClick plans to sponsor smaller versions of the same ads for all OmniSky wireless handhelds. If you haven't seen these ads already, you will—both companies plan to launch more than 200 of them by spring.

According to Jamie Byrnes, director of strategic development and emerging platforms at DoubleClick, officials at both companies expect the plan to establish a viable advertising mechanism for the wireless market.

"The users of wireless handhelds are similar to early Web users in that they are a very tech-savvy early-adopter audience," he says. "This is the audience that attracted advertisers to the Web."

Palo Alto, Calif.-based OmniSky officials agree, justifying their optimism with Jupiter Research reports that say the wireless market will grow to \$750 billion by 2005. Based on this, Director of Wireless Advertising Paul Catalano considers the plan a "slam dunk" and says the wireless market could eventually double profits for advertisers. As for users, he says, the deal will make "wireless a true reflection of the Web," bringing e-commerce to the handheld, injecting "advertising into virtually everything."

Just what you were hoping for, or what? —Matt Villano



the message is customized

Here's a unique idea: hosted electronic messaging solutions created specifically for your company by United Messaging. Whether you use Microsoft Exchange®, Lotus Notes®, or Internet mail, our specialists provide a messaging system with your unique needs in mind. And since we monitor and maintain the entire system, your days of continually upgrading and troubleshooting are over. Just think of it as electronic messaging custom-built for your success. For an e-mail system you can truly call your own, call United Messaging at **1-888-993-5088**, or visit us at **www.unitedmessaging.com**.



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Off the Shelf

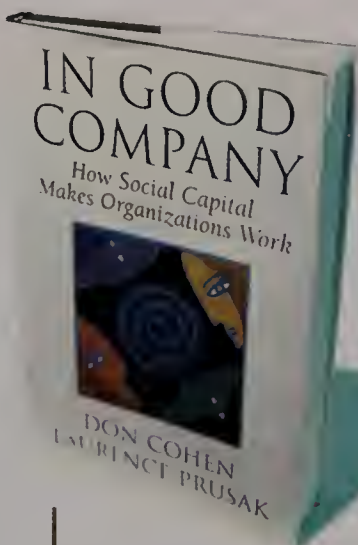
Edited by Carol Zarrow

Social Action

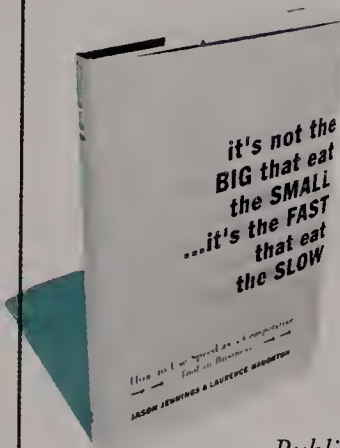
In Good Company: How Social Capital Makes Organizations Work
By Don Cohen and Laurence Prusak
Harvard Business School Press, 2001, \$27.50
Ever thought that employee gossip could lead to revenue growth? Connections like this one (however unlikely a pairing gossip and growth are) are discussed in *In Good Company*, which examines the beneficial results of workplace interactions. As defined by authors Don Cohen and Laurence Prusak, social capital is "the stock of active connections among people, the trust and shared values and behaviors that...make cooperative action possible." When social capital is nurtured, a company can expect to see a return on its investment, just as it would if it built a new IT infrastructure.

The authors' examination of social capital covers everything, from the benefits of storytelling to the challenges of virtual connections such as e-mail. Along the way the book provides examples of companies whose devotion to social capital has paid dividends in the long

run—and it shows how ignoring the power of social interactions can prove costly. What is most refreshing about *In Good Company* is that the authors not only examine and clarify the benefits of social capital, they suggest ways to foster it.
—Joe Kendall



And...



It's Not the Big That Eat the Small...It's the Fast That Eat the Slow
By Jason Jennings and Laurence Haughton
HarperCollins Publishers, 2000, \$26

Drop those five-year plans to make your company successful, release the brakes, and bury the needle. When taking the fastest route, however, you need to be cautious and act smart. And although the authors fall short on the how (you'll find some of their rah-rahing too idealistic), this easy read is worth it for its commonsense tips (question everything and be ready to anticipate your next move), untapped tactics (acting dumb is actually smart) and tidbits from AOL and Hotmail executives. These pages are meant for absorbing—fast—and passing on to coworkers.

—Sarah Johnson

CIO Best-Seller List

5.

Hand-Me-Down Dreams: How Families Influence Our Career Paths
by Mary H. Jacobsen
Three Rivers Press, 2000

4.

The Future of Success
by Robert B. Reich
Alfred A. Knopf, 2001

3.

Getting Things Done: The Art of Stress-Free Productivity
by David Allen
Viking Press, 2001

2.

The Art of Possibility
by Rosamund Stone Zander and Benjamin Zander
Harvard Business School Press, 2000

1.

Built to Last: Successful Habits of Visionary Companies
by James C. Collins and Jerry I. Porras
HarperCollins Publishers, 1994

SOURCE: JANUARY 2001 DATA COMPILED BY WORDSWORTH BOOKS, CAMBRIDGE, MASS.

TELL US what you're reading at books@cio.com.

What They're Reading

Steve Kolodney, director, Washington State Dept. of Information Services, Olympia
Watts Wacker and Jim Taylor, *The Visionary's Handbook: Nine Paradoxes That Will Shape the Future of Your Business* (HarperCollins, 2000) "It makes sense of the paradox of living in the present and the future all at the same time."

David M. Cooper, CIO, Lawrence Livermore National Laboratory, Livermore, Calif.
Dorothy E. Denning, *Information Warfare and Security* (Addison Wesley, 1998) "I highly recommend the book as it is an excellent overview of the threats facing an 'owner' of information as well as how to best protect that information."

Drop In Anytime.



It's quite a dilemma. Managing your own e-Business gives you control but it's a complex and costly operation. Outsourcing provides relief, but makes you feel disconnected, not knowing exactly what's going on at any given time.

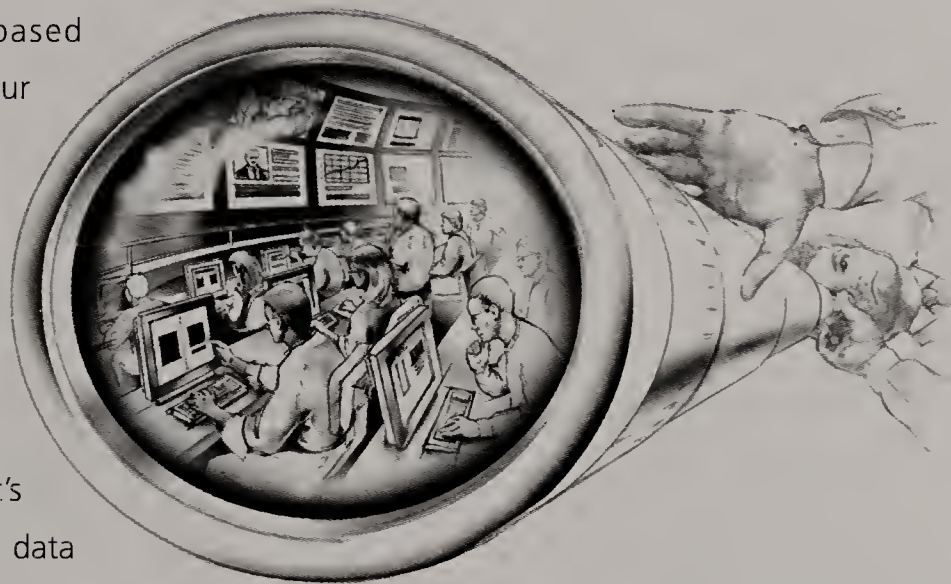
At last, a breakthrough solution.

Introducing yet another advantage from Digex — ClientCentral. It's the hands-on way to outsource your Web hosting to one of the industry's leaders. With Digex, you'll always be in touch with your investment. Anytime. Anywhere.

Now critical management decisions can be based on up-to-the-minute information and server performance. Digex handles the managed Web hosting. Our ClientCentral keeps you informed. And at ease.

With ClientCentral every crucial aspect of your e-Business is delivered in an XML-based workflow that easily interfaces with your own back office environment. It's omniscience made easy. Now you're free to check up on your server operations and hardware/software inventory anytime. Of course, like every aspect of Digex, ClientCentral is thoroughly secure. All information is accessible only by you. It's personal access complete with ironclad data protection. Case management data is readily

available, exported straight into your systems for your continued analysis. And, should you experience any difficulties, response time is even faster than before. In fact, ClientCentral keeps you in touch with problem resolution progress as it happens. Find out how ClientCentral can improve your e-Business. Visit www.digex.com/client. Or call 1-800-455-2968 ext.660 and always stay connected to your investment.



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HOT TOPIC



CAREER

Step Right Up!

By Stephanie Viscasillas

YOU LIKE BEING a CIO, think you might like to travel even further up the corporate ladder someday. How do you get to the top rung? We asked Mel Connet, a cofounder of Connet & Co., a Menlo Park, Calif.-based executive search company that recruits CEOs. **CIO: What characteristics make a good CEO?**

Connet: Understanding how the market is likely to change and evolve. The ability to recruit the right people for the right jobs, and the ability to retain, motivate and lead those people. The ability to set and communicate clear goals and hold people accountable for those goals. Personal characteristics of integrity, self-confidence, flexibility, adaptability, energy and drive.

What makes a former CIO a good choice for CEO?

Many of the challenges faced by CIOs are similar of those of a CEO—they run large, complex organizations in environments characterized by limited resources, ambiguity and rapid change. The CIO's knowledge of the market and customer requirements also contributes to his ability to set and execute strategy as a CEO. When the company's competi-

tive advantage comes largely through its use of IT, the CIO can have a tremendous advantage over candidates with other backgrounds because of their knowledge of what is core to the company's success.

Do you generally recruit CIOs from successful companies or would you take, say, a CIO from a failed dotcom?

Generally speaking, CIOs from smaller companies do not have the breadth of business experience needed to move into the CEO role. In many cases, the CIO role in Internet-based companies is becoming more broadly defined to include operational aspects because of the nature of that set of business models. In these cases the background can be very appropriate.

What would make a CIO leave that position to be a CEO?

Most people who aspire to become CEOs seek the sense of accomplishment that comes from successfully running the whole show.

Any tips for a CIO thinking about making a move to CEO?

Be sure you have an in-depth understanding of each of the functions in a company's organizational structure. Seek out a seasoned CEO as a mentor to help you with unfamiliar territory. Be results-oriented, focus on the big picture, and act like a CEO.

GLOBALIZATION

Surfing in Tongues

By Ben Worthen

WORLD WIDE WEB addresses were recently liberated from the tyranny of roman characters. This blow to the English language's hegemony came on Nov. 10, 2000, when Mountain View, Calif.-based domain name registrar VeriSign started registering Web addresses in Chinese, Korean and Japanese characters.

The move benefits two constituencies:

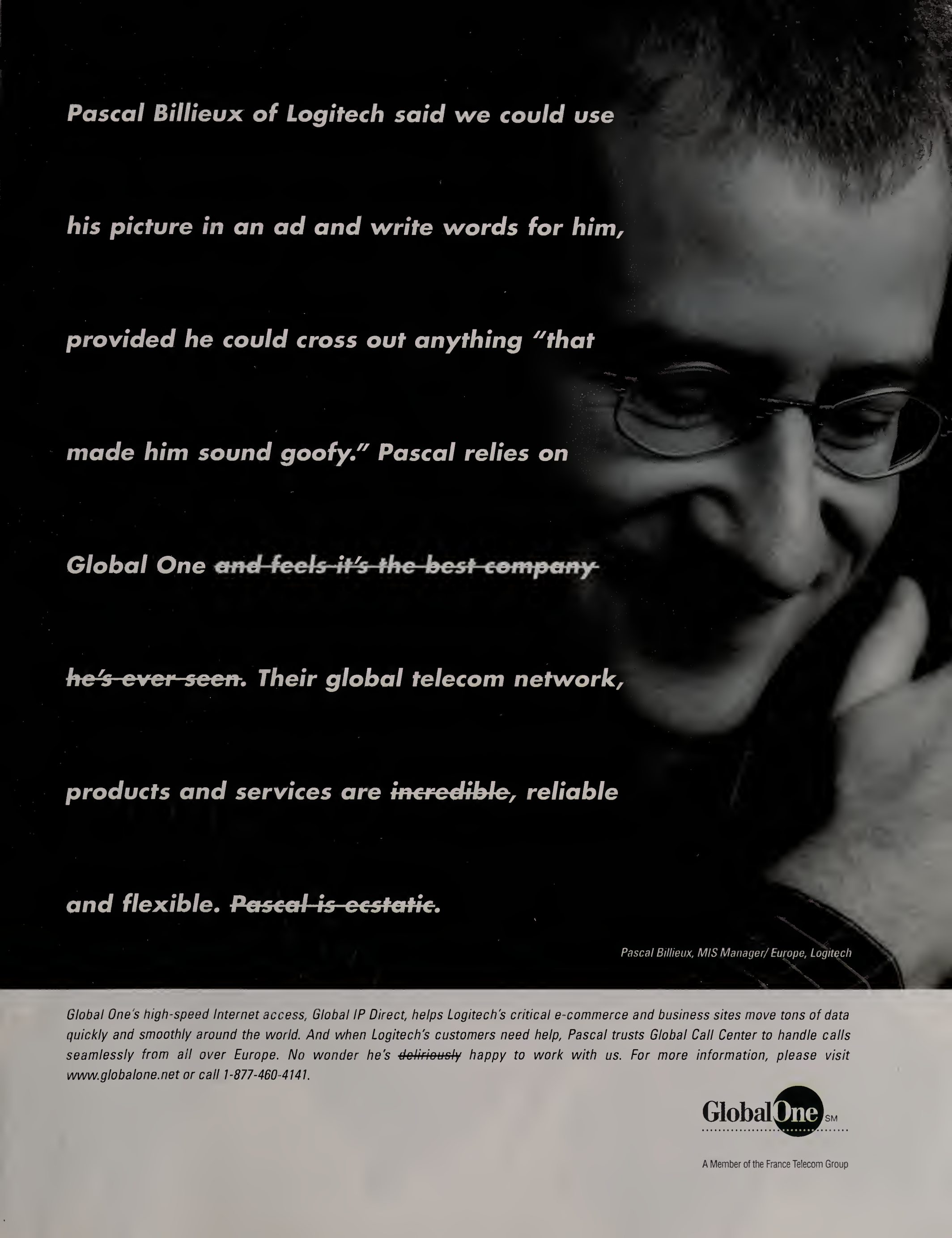
first and most obviously, Pacific Rim Web surfers, who will no longer have to type URLs in a foreign alphabet.

The other beneficiaries are large corporations that wish to protect their brand names. Now Coca-Cola can register the Korean equivalent of its name. As of mid-December, VeriSign had registered over 700,000 domain names, including 275,000

in Chinese, nearly 250,000 in Korean and 200,000 in Japanese. Names will gradually be assigned IP addresses so as not to interfere with the more than 24 million already active domains. VeriSign also offers translation services to ensure that, say, Coca-Cola doesn't discover that its Korean Web address reads something like *bitethewaxtadpole.com*. —Ben Worthen

“MONEY IS ALWAYS THERE, BUT THE POCKETS CHANGE.”

—Gertrude Stein, writer (1874-1946)



Pascal Billieux of Logitech said we could use

his picture in an ad and write words for him,

provided he could cross out anything "that

made him sound goofy." Pascal relies on

Global One ~~and feels it's the best company~~

~~he's ever seen.~~ Their global telecom network,

products and services are ~~incredible,~~ reliable

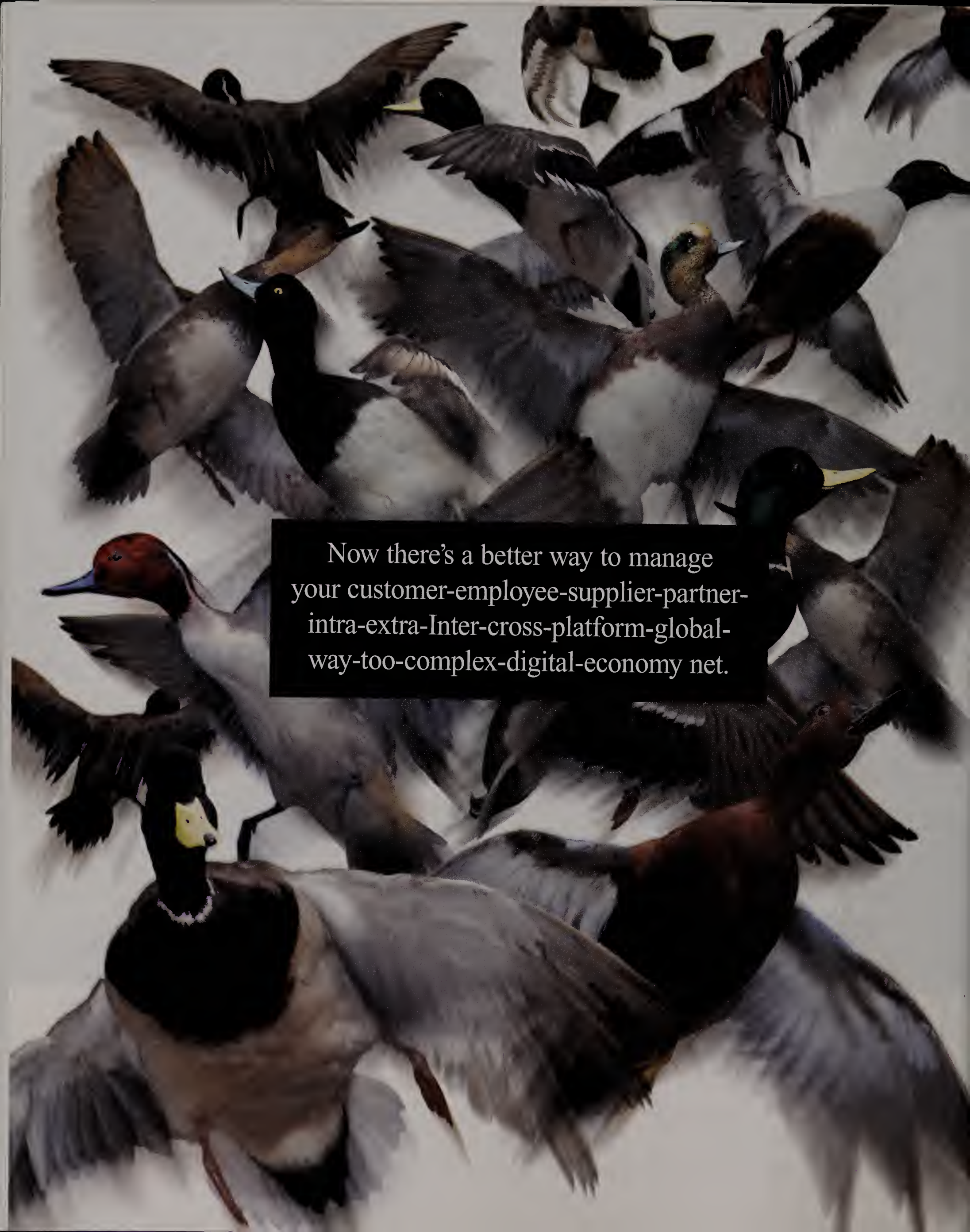
and flexible. ~~Pascal is ecstatic.~~

Pascal Billieux, MIS Manager/ Europe, Logitech

Global One's high-speed Internet access, Global IP Direct, helps Logitech's critical e-commerce and business sites move tons of data quickly and smoothly around the world. And when Logitech's customers need help, Pascal trusts Global Call Center to handle calls seamlessly from all over Europe. No wonder he's ~~deliriously~~ happy to work with us. For more information, please visit www.globalone.net or call 1-877-460-4141.



A Member of the France Telecom Group

A large, dense flock of ducks is shown in flight against a plain white background. The ducks are in various stages of flight, with wings spread wide, creating a sense of movement and chaos. The ducks have various plumages, including dark brown, grey, white, and reddish-brown. Some have distinctive yellow or red heads. The overall composition is a busy, overlapping mass of birds.

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Get Real...with John Sviokla

Creating Value in the New Economy

Please, Pick Up the Phone

Your strategic e-commerce advantage is ringing in your pocket

EVER WORRY THAT creating an e-commerce infrastructure is going to take too long and cost too much? Consider building on the e-commerce infrastructure that already exists under your nose. Just dig up your last phone bill and you'll see it. Just as mutts and corn seeds are made stronger by their crazy-quilt heritages, electronic devices show their strength in the number of different ways they are broken up and recombined with other gadgets. Radios and TVs started as furniture but have become ubiquitous, crammed into cars, microwaves, computers and portable stereos. Likewise, computers are leaping off desktops and into devices such as PDAs and mobile phones.

But phones are going to become more ubiquitous and much more important to the next wave of e-commerce growth than any of those other gadgets. Phones are a much better medium for human communication—voice to voice in synchronous time. Make no mistake about why people want phones in their PDAs—they make better, smarter phones than cell phones do.

“Phoneness” will be part of everything and come in every form imaginable—from key chains with phones built into them to PDAs to Happy Meals that include free phones with



which you can call your favorite Disney character.

Not interested in how Mickey's day went? The gadgets aren't nearly as important as the potential lurking within them. Customers like to be connected. The more often customers talk to you (willingly), the less likely they are to defect to a competitor. DiamondCluster found that when the number of these customer interactions rises from once or twice per month to between three and five times per month (on average), the defection rate of the cell phone customer drops from 13.9 percent to 7.8 percent. Financial services companies have found similar effects. The overall imperative is to get your customer talking to you and talking to you often. Multiple interactions will be beneficial to retention.

Phones will open an exponentially larger and more intensive time window for doing business when they combine computing power with the phone's ubiquity and “onness.” Unlike the

navigate

summarize

categorize

locate

find

Making Information Make Sense

Inxight
Categorizer

automatically

puts
documentsin their
place.

Inxight Categorizer.[™]
An automated solution
to get a handle on
vast information libraries.

A next-generation indexing and classification powerhouse. They're all over the place—MS Office documents, emails, PDF's—and they're at the heart of information overload and an organizational nightmare. Until Inxight Categorizer. Because Categorizer automates the process of examining, indexing, and classifying unstructured data. Accurately, consistently, and enabled by a revolutionary language-smart intelligence to capture both the context and content of each categorized file. Find out more about Categorizer by calling our toll-free number at 1-866-345-INFO. Or visit our website to learn more about Inxight's comprehensive and integrated suite of web building and content optimization tools. Inxight Categorizer. Anything less just doesn't hold water.

www.inxight.com

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computer, the phone is always available, always running. The psychology of buying and selling is totally different when people have a device with them that is always live.

Infrastructure to Go

Consider too that the infrastructure for doing business on the phone is already well-established. No other industry has the capability to bill for so many different kinds of services right down to the individual level. The Internet doesn't come close. Yahoo, may know your e-mail address and some basic facts

message traffic is already higher than the total voice traffic of most individual countries.

So, if you're worried about having missed the Internet revolution, don't worry, you can still get in on the phone revolution—if you learn how to get close to your phone company. Large mutual fund and brokerage houses like Fidelity, which have been pioneers in the use of wireless technology, can be great partners for telecommunications providers. (See "Wireless: A CIO Special Report," beginning on Page 76.) There is a fantastic synergy between the needs of the phone companies, which must increase their average revenue per use (known as ARPU), and the desire of a Fidelity to increase customer touch points and decrease churn.

Furthermore, many senior executives at phone companies are facing steep expectations by their investors to grow their businesses. The ability to partner with strong content providers can provide significant advantage if they are open to

When you are on your phone, the company knows who you are, where you live, who you're talking to (and soon, where you are).

about you, but for every commercial transaction you have with Yahoo you need to break out your credit card. When you are on your phone, the company knows who you are, where you live, with whom you are talking (and soon, where you are). This is a much more powerful knowledge base.

Just as important, phone customers are used to getting these bills and paying them. Adding services to the bill and getting customers to pay for them is much less of a challenge in this context than it is on the Internet. Think about how difficult it has been for Internet merchants to get customers to pay for new services. They have had to fight tooth and nail to build up customer loyalty to the point where they can extract a few measly dollars out of the relationship.

If phones—even cell phones—seem low-tech next to computers, remember that the economics and sophistication of computing technology are converging. In the not too distant future we will have portable phones every bit as powerful as a workstation of today and available in many digital versions of consumer electronic functionality and capability.

We also know that the evolution of the phone will look like the evolution of the personal computer. The PC took off when the components became generic and interchangeable, dramatically increasing the audience of software developers. New low-power consumption processors and a gradual standardization of phone components will bring the same kind of software explosion to phones.

We don't have to wait to see how the business models behind these new gadgets will work. In Japan, NTT DoCoMo customers are being billed for microtransactions (involving fractions of a yen) to read investment information or feed their digital Tamaguchi pets. In Scandinavia, people there give out their cell phone number as their primary number. European instant phone

exploring how new content is complementary to phone storage and usage. The stakes are enormous.

For nontelecommunications executives, the opportunity is to become more conversational with your customer and begin a deeper, always there, always-on type of relationship. First and most urgent, major companies now have the opportunity to cut deals with the major phone companies for placement of their product or service. For any company in a business-to-consumer space, this is the time to be pursuing such partnerships.

But if these experiments are to go anywhere, the phone companies and the companies that create the mobile connections with customers will have to avoid making these services just another circle of voice-mail hell. The cellular connection brings with it an expectation of immediacy and urgency, and if it becomes just another channel for holding Muzak, it could turn away more customers than it adds.

The Bottom Line

This is a chance to catch up if you missed the Internet wave. And if you caught the wave, you can make your lead even bigger. You need to support mobile technology to serve customers right now, not tomorrow. You can cater to each customer, since everyone has a mobile phone. Prices for the technology keep dropping. At the same time, the potential to charge for and track all kinds of transactions increases. Even without the bells and whistles promised, today's mobile technology—always live and great for forging and maintaining customer relationships—is a must. **CIO**

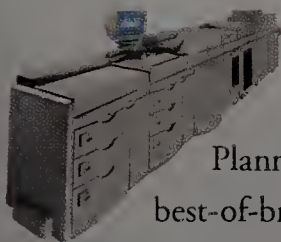
Want to talk more on the phone? E-mail John Sviokla, vice chairman of Diamond Cluster International, a Chicago-based consultancy, at getreal@cio.com.



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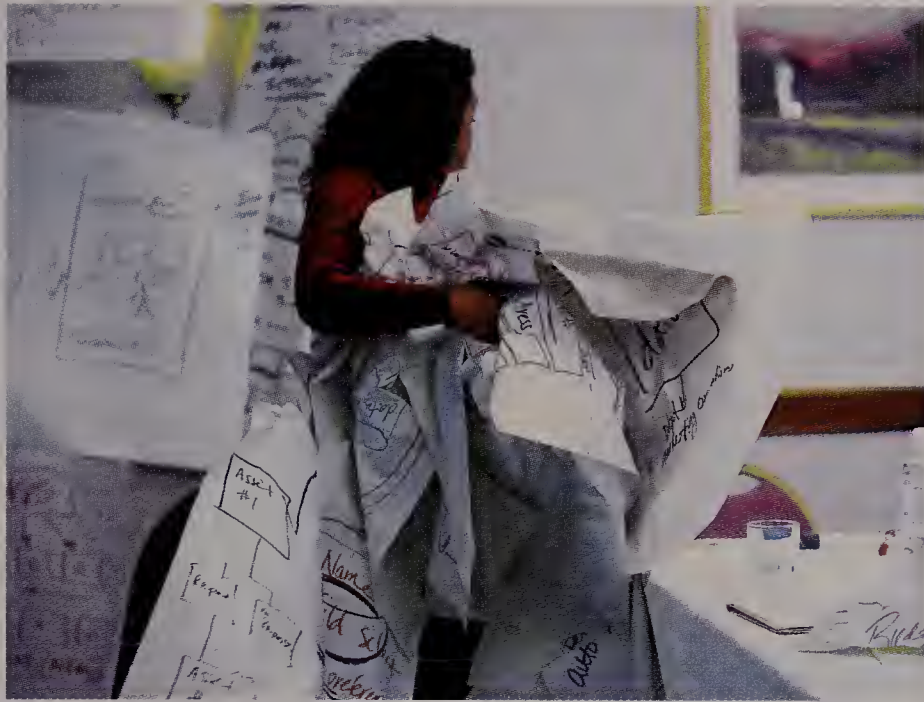
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Ask the Expert

We're Not Experts on This, but We Know Someone Who Is

Policing Privacy

Joel Rothman, an attorney with Seiden, Alder, Rothman, Petosa & Matthewman, P.A., in Boca Raton, Fla., answered your questions regarding Internet privacy laws and what companies that collect data through the Internet should do to protect themselves. Henry Cooper, LLM, associate at Seidman, Alder, Rothman, also contributed to these answers.

Q: What liability do Web hosts have as a result of the Children's Online Privacy Protection Act (COPPA)? Specifically, does a website operator have an obligation to block click-through ads to prevent kids' data from being passed from their site to the advertiser? Could this new rule be interpreted to mean that anyone who receives e-mail from a person who declares his age as 13 or younger would have to contact the kid's parents or risk a fine from the Federal Trade Commission?

A: Web hosts are exempt from liability under subsection (b) of COPPA. This provision exempts "Carriers and Other Service Providers" for liability for communications that are unlawful under this Act. A "Carrier and Other Service Provider" is defined as "a telecommunications carrier engaged in the provision of a telecommunications service; a person engaged in the business of providing an Internet access service; a person engaged in the business of providing an Internet information location tool; or similarly engaged in the transmission, storage, retrieval, hosting, formatting or translation



(or any combination thereof) of a communication made by another person, without selection or alteration of the content of the communication." Under this subsection, it is not considered an "alteration or selection" for a Web-hosting company or ISP to delete a particular communication or material made by another person in a manner consistent with subsection (c). A Web-hosting company has no obligation to remove or block the unlawful communication unless specifically ordered to do so by a U.S. court.

Q: An employee of mine has asked for a letter of indemnification from our organization. He is a network engineer who, in the duty of his job, has been asked to investigate and track down hackers or inappropriate behavior (for example, copyright infringement). As people's privacy is at stake, he does not want to be held personally liable for doing his job and finger-pointing.

ILLUSTRATION BY JOSEPH FIEDLER



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Ask the Expert

There is always the possibility that the accused individual could take legal action on the engineer. What is the best course of legal action to protect both the organization and the engineer?

A: It is very important that your company institute an acceptable use policy for computers that states what kind of access is permitted on the company's computer system, and that the employer has the right to monitor and restrict access to those resources. Also, a detailed privacy policy should be instituted so that the employee understands how much privacy he can reasonably expect in the workplace. The accept-

sonable expectation of privacy against employers' concerns in protecting their computer systems and minimizing the risk of liability.

In Canada, the issue of employee privacy is the subject of a new law passed last year called the Personal Information Protection and Electronic Documents Act (PIPEDA). The Act applies whenever an employer collects, uses or discloses an employee's personal information in connection with the operation of its business. Under PIPEDA, an employer may collect, use and disclose an employee's personal information without the knowledge or consent of the employee—if the collection, use and disclosure of the personal information is to investigate a breach of a company agreement or policy, fraud or other violation of Canadian law. An employee who believes his rights were violated under the Act may seek damages against the employer by filing a complaint with the Privacy Commissioner of Canada.

Ensuring that employees understand the limits and extent of their workplace privacy rights is vital to the company.

able computer use policy should contain provisions outlining the company's rules regarding access to online pornography, trademark and copyright issues, e-mail rules and other online activities that the company wants to restrict. The policy should be read and signed by each employee. Under the Electronic Communication Privacy Act, an employer has the right to investigate and view employee's electronic communications for maintenance and security reasons. Under the Computer Fraud and Abuse Act, it is lawful for an organization to take measures to ensure the protection of its computer system. At your discretion, you may have an attorney draft an indemnification agreement between the network engineer and your company. The indemnification agreement would contain provisions that describe the specific situations in which your company will indemnify him from liability for his job duties.

Q: In Canada, is it legal to monitor what employees look at on the Internet, and are there particular rules?

A: An employers' right to monitor and control both access to the Internet and the company's e-mail system may raise concerns over an employee's right to privacy. In the United States, the issue of privacy invasion is determined by balancing employees' rea-

Q: I work in the health-care industry, and I'm looking for a reference guide to online privacy laws by country (or region, like the European Union). Alternatively is there a listing that would show what you need to have in your privacy policy to meet requirements everywhere?

A: A standard, all-inclusive privacy policy does not exist because each privacy policy is tailored to the organization's specific needs and the laws of the country where it is located. To my knowledge, there is no resource, whether offline or online, that contains a tabular reference indicating the online privacy laws by country or region. However, there are two websites that are extremely informative. FindLaw's CyberSpace Law Center provides a comprehensive database containing information regarding online privacy. It is located at cyber.lp.findlaw.com/privacy. The website has hyperlinks to resources regarding online privacy law involving the health-care industry as well as the general workplace environment. Another website, Privacy and Human Rights: An International Survey of Privacy Laws and Practice (www.gilc.org/privacy/survey), contains a hyperlinked table of 50 countries. Each country's hyperlink leads to a general discussion of that country's online privacy law with footnotes to the legal authority. **CIO**

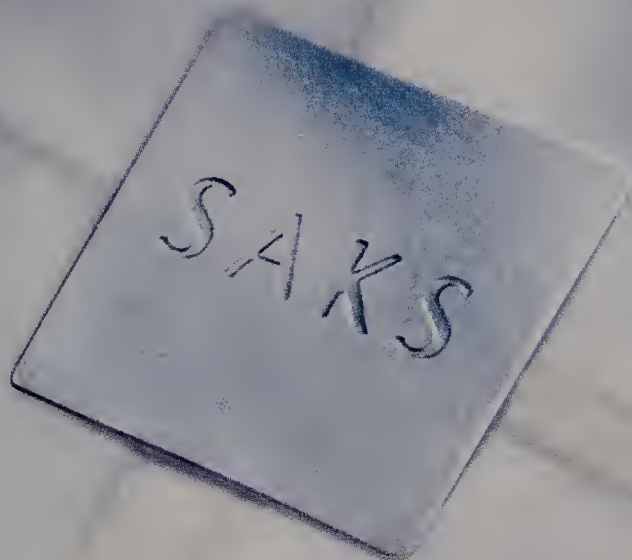
Obligatory legal warning: The information on this page does not constitute legal advice and is not intended to create a lawyer-client relationship. You should not act upon this information without seeking professional counsel. To recommend an expert for this column or suggest a topic, e-mail Senior Writer Daintry Duffy at dduffy@cio.com.



Ask the Expert

Have a question about crafting a solid technology policy for your company? Until March 31, **Ken Segarnick**, assistant general counsel of Philadelphia-based United Messaging, will be online to answer your questions at www.cio.com/CIO/expert.

cio.com



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Fine Print

What You Don't Know Can Hurt You

Independents' Day

You may call them contractors, but the courts say they're employees

BY EVAN FRAY-WITZER

THE DEAL IS INKED. You knew your wireless technology was killer, and you were right. Then the panic sets in. How are you and your staff going to hit those deadlines? Most employees already sleep under their desks at night (if they sleep). You need bodies, fast. Coders, testers, tech writers—the works. The problem is, you aren't going to need them for that long—a year or two, tops—and you don't want to add that many new regular employees. After all, big payrolls make investors nervous, and let's face it, you were generous with those stock options and benefits because you wanted to reward the people already with you for taking a big risk when you started the company.

The solution seems obvious: independent contractors. To ensure none of the contract terms is a secret, make sure that your independent contractors' (IC) agreement spells out everything clearly: no long-term commitments, no paid benefits or stock, just a nice hourly wage. So you're golden, right? Um, no. Actually, you may have just gotten yourself in deep.

Just ask Microsoft, which got sued by workers and wound up paying a whopping \$97 million. Or Harvard University. Or Los Angeles County, Pacific Bell, Time Warner or any number of



employers who have found themselves on the receiving end of a lawsuit from workers hired as temps and ICs claiming that they were really common-law employees entitled to the same benefits as regular employees. Just how bad can it get? Here is a partial list of trouble a company encounters when it mischaracterizes its employees as independent contractors.

IRS trouble Microsoft's woes began when the IRS audited its finances and determined that Microsoft had improperly classified workers as ICs. That meant that Microsoft owed the federal government a large sum in unpaid tax withholdings (the employer's share), plus interest and penalties. It also meant that certain benefit plans, which received favorable tax treatment because they were open to all employees, might lose that treatment unless the ICs were retroactively added to the plan.

ERISA trouble The Employee Retirement Income Security Act (ERISA) was enacted in 1974 to protect workers from

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losing certain benefits. If an employer is found to have mischaracterized employees as ICs, the workers may be entitled to receive ERISA benefits retroactively. ERISA-based denial-of-benefits claims include those for health insurance benefits, 401(k) benefits and stock option benefits, among others.

Other benefits trouble The mischaracterization of workers can bring into play myriad statutes and responsibilities that you probably wanted to avoid all along, including overtime pay, unemployment insurance, workers' compensation insurance, holiday pay, vacation pay and sick leave. An employer's failure to pay such wages (or provide such coverage) can result in awards of multiple damages, costs and attorney's fees. And even more

uments relating to those plans, like summary plan descriptions and employee handbooks. Carefully worded documents can exclude certain classes of workers. In Microsoft's case, however, benefit plans stated they were open to all "employees," which the court found included common-law employees.

4. Limit the amount of time that an independent contractor can work for your company and require breaks between projects. The longer an IC works for you, the more it begins to look like employment. If you really can't live without a particular individual, it may be time to bite the bullet and hire the person as a regular employee.

5. Use clear, well-worded IC agreements, but understand their limitations. A clearly written, comprehensive IC agreement spelling out the details of the relationship is an essential risk management tool. On its own, however, even a good contract has limits to what it can accomplish.

6. Use a placement agency, but know the limitations of these arrangements too. Using a placement agency can help eliminate some, though not all, of the dangers of employing ICs. Reputable placement agencies pay not only the withholding taxes for their employees but also unemployment insurance and workers' compensation insurance. Your agreement with an agency should contain indemnification language that states that the agency will defend and indemnify your company against any liability for a failure to pay taxes, insurance or the like.

7. Consider the downsides of having independent contractors as well as the benefits. Although employers are often aware of the benefits of hiring ICs, they are sometimes unaware of the risks involved and as a result fail to take proper precautions. For example, in the absence of a written agreement to the contrary, it is presumed that intellectual property created by an independent contractor belongs to the contractor individually (the opposite is true for an employee).

8. Don't get greedy. If you want to hire a worker as an IC and reap the benefits of doing so, you need to give up some of the benefits of hiring an employee. For example, including employee-like restrictions in an IC agreement (such as a noncompete clause) may well lead a court, the IRS or another government entity to conclude that you really intended to hire the person as an employee. **CIO**

Don't get greedy. If you want to hire a worker as an IC and reap the benefits of doing so, you need to give up some of the benefits of hiring an employee.

frightening for employers, some states allow workers to collect damages not only against the employer but also against individual corporate officers. It happens all the time under various wage statutes and workers' comp statutes.

Statutory trouble Certain state and federal employment statutes apply only to companies with a set number of employees. For example, employers are required to offer Family Medical Leave Act benefits only if they have 50 or more employees. A company that thought it employed fewer than 50 employees could easily find that once the presumed ICs are added to the mix, it actually employs more than that.

So what should you do? Close up shop? No, but it does call for some serious thought and risk management. Here are some ways to protect yourself.

1. Just because you call someone an independent contractor doesn't mean he really is. The IRS and the courts typically use a 20-factor test to determine if a worker is an employee or an IC. The factors generally focus on who controls the way work is performed. For example, expecting someone at the office at a specific time looks like an employer-employee relationship. But, if workers can set their own hours and decide whether to work from home, their own office or your office, the relationship starts to look more like an IC arrangement.

2. How you pay a person makes a difference. To start, ICs should be paid 1099 wages (without regular payroll deductions) as opposed to W-2 wages. If at all possible, payment should be structured on a per-project basis as opposed to an hourly, weekly or monthly salary.

3. Review the language of your benefits plans and any doc-

Evan Fray-Witzer is a Boston-based employment lawyer whose practice includes employment counseling, contract and handbook drafting, and employment litigation for numerous high-tech and biotech clients. Send your thoughts on legal matters in your industry to fineprint@cio.com.



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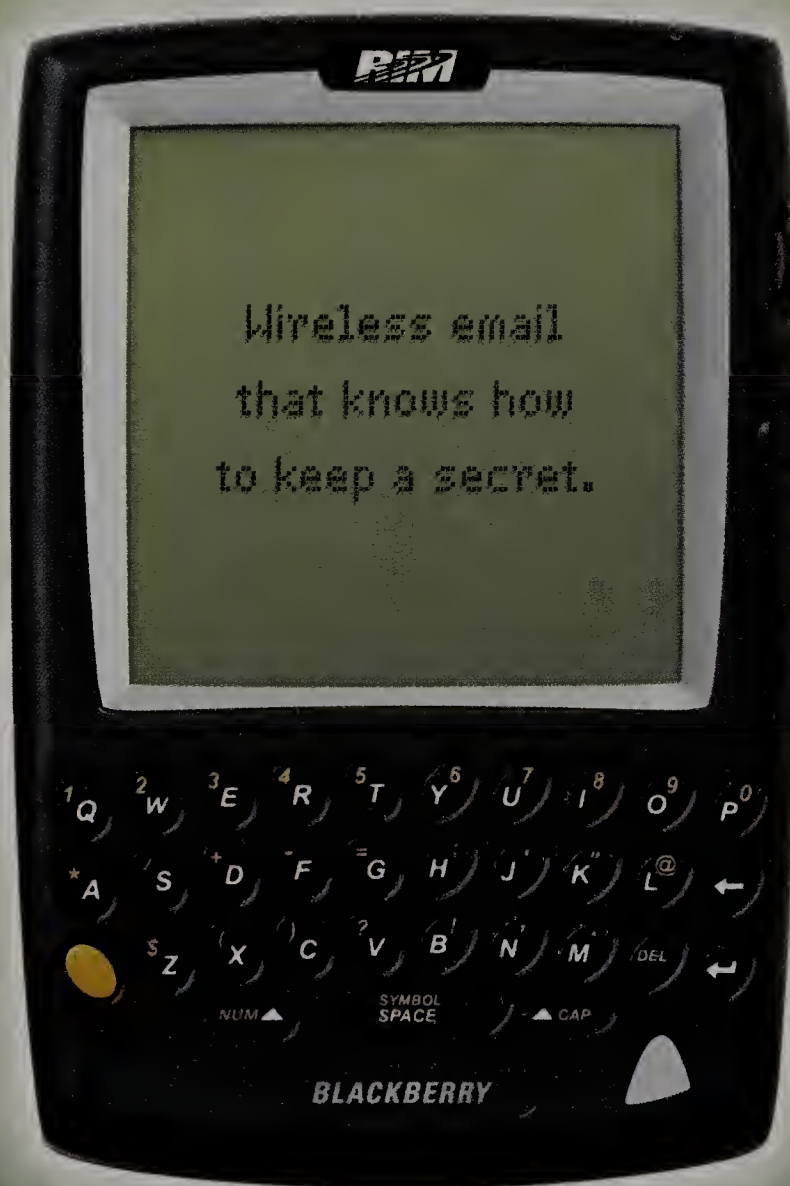
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When it comes to wireless email, there's one thing most products ignore. It's that 'little' issue called security. Then there's BlackBerry™. It's a complete wireless email solution actually engineered to meet your corporate security standards. BlackBerry is a totally integrated package that features powerful wireless handhelds, desktop tools, enterprise server software, advanced encryption technology and nationwide airtime. With support for Triple DES encryption, BlackBerry's end-to-end security model ensures the authentication, integrity and confidentiality of all incoming and outgoing email messages. No wonder BlackBerry is becoming the corporate standard for wireless email. It's safe to say that it's the best for business.

“ They took good care to ensure security. Not only is there password protection for the BlackBerry handheld, but it also uses Triple DES to encode messages between the desktop and the handheld. ”

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Culture champs: Athene Software President and CEO Eric Johnson (left) and Vice President of Engineering Richard Wolniewicz

Corporate Cultural Manifesto

Athene Software went by the book to create an engineer-friendly culture

BY MARK GORDON

Edited by Management Editor Edward Prewitt. Got a great management story to tell? Send it to him at hotseat@cio.com.

CORPORATE CULTURE IS THE context framing any conversation about recruitment and retention, productivity and profitability. In time, a culture of one sort or another will come to characterize your company or depart-

ment. As an executive, you have the management prerogative to establish practices and set goals, but how can you lead employees to share attitudes and values? And can you really expect a gaggle of intelligent, creative and at

times antisocial IT employees to become a cadre animated by high performance?

One company that has met this challenge is Athene Software, a Boulder, Colo.-based developer of CRM software for communi-

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cations service providers, ISPs and other e-businesses. Privately held, venture capital financed Athene employs 85 people, 60 percent of them engineers. Since its founding in 1997, the company has lost just four people, all nontechnical—despite being located in Boulder, one of the hotter technology markets in the United States. Software projects regularly come in on or ahead of schedule. The company's technical support group is so idle that it's known internally as the Maytag department. Observers in and outside Athene credit this remarkable success to the deliberate construction of a distinctly engineer-friendly culture that nurtures loyalty and excellence.

Much of the inspiration for Athene's corporate culture is drawn from *PeopleWare*, written by Tom DeMarco and Tim Lister, a landmark 1987 book on software development that was reissued in 1999 by Dorset House Publishing. *PeopleWare*'s thesis is that success in an IT environment is much more a function of sociology than technology. Software is all about smart people joyfully working together in teams. Although it's a truism that organizational models inherited from the industrial revolution don't fit the needs of today's "intellect workers," many companies unconsciously fall into old cultural patterns, demonstrating by their actions that they value capital more than labor. Consistent creation of good software requires that people be treated with the same respect that the instruments of production were in an earlier era, say DeMarco and Lister.

Recruit to Retain

Potential employees encounter Athene's culture long before their first day at work. President and CEO Eric Johnson has crafted a vetting regimen worthy of the U.S. space program. "We ask ourselves what makes a good engineer, from an engineer's point of view," he says.

the world, often screens résumés and conducts phone interviews with prospects. Employment, academic and criminal background checks are conducted on everyone. Finally, candidates who successfully pass through the earlier stages of the vetting process are required to "audition" before a voluntary assem-

us something about them too."

The auditions, which run an hour or more, have given Athene a reputation as the measuring rod for engineers in the Boulder market, Johnson says; if you can make it there, you're good enough to make it anywhere. But auditions serve a second, equally important purpose, says Vice President of Engineering Richard Wolniewicz: They help retain the employees already there. "The thing that IT professionals appreciate is working with really smart coworkers," he notes. Athene employees take the auditions seriously. About 25 people, on average, show up at each audition, and some employees rarely miss any. Auditions by PhD-level candidates resemble doctoral defenses, drawing many more people and tending to run much longer than an hour.

A Balanced Approach

Once on board, new engineers find that things at Athene are, well, different. The company has no secretaries and no HR department. An office manager handles 401(k) administration. There are no cubicle cities—engineers work in private offices or small team rooms—and the company invests heavily in quality control. Instead of building the typical corporate infrastructure, Athene has put its energies into nurturing an environment that adapts to people's needs, rather than expecting the inverse.

"A big part of our culture is the idea of balance," explains Johnson. "Everyone has a hierarchy of things that are important to them. For some, it's

AT A GLANCE

Inside Athene Software

The Company: Athene Software (www.athenesoft.com), a privately held, venture capital financed developer of CRM software for communications service providers, ISPs and other e-businesses, headquartered in Boulder, Colo.

The Need: Athene's founders set out to create an engineer-friendly corporate culture that would nurture loyalty and cultivate outstanding software.

The Response: Inspired by *PeopleWare*, a 1987 book on software development, Athene focuses on sociology rather than technology. The company auditions recruits, gives employees private offices instead of cubicles and enforces a work-life balance.

"If you want to be the best, you have to get the best people. You just can't get there with the adequate or the ordinary."

Athene's recruitment process features a series of intensive interviews with key managers, including Johnson, as well as potential peers. The company's Technical Advisory Board, a group of six PhD-level mathematicians and statisticians from universities and institutes around

bly of company employees.

"We ask the candidate to demonstrate something we should know about them to show us how they'll fit in," says Johnson. Most prospective hires embrace the opportunity. "We've had people write poems and do martial arts demonstrations. We've had race car drivers and firefighters. Of course, sometimes people just stand and read their résumés, and that tells

Managing Next Generation Wireless Networks

IT ALL SOUNDS VERY FAMILIAR. In the early 1980s, frustrated with their IT organization's slow adoption of personal computers, employees began smuggling their own PCs into work. It took years for IT to sort it all out and provide the necessary policies, standards and purchasing procedures. Today it's déjà vu all over again—but this time, instead of PCs, wireless handheld devices are the culprits. Highly mobile employees are buying these devices in droves to handle wireless email and messaging.

But the potential headache for today's CIOs lies not so much in the influx of the devices themselves. The problem is that when your users buy one of these new wireless handhelds, they are also buying the network that the device runs on. And it is the quality of the wireless network that determines how well the device works.

If the user decides that the service leaves a lot to be desired, or wants a new handheld with more features from another provider, it results in tossing the old device and buying a new one. New device, new service provider, new network. All without involving IT.

But, because the user is doing company work, accessing company files and, inevitably, turning to the company help desk for assistance, IT is involved. By the simple act of purchasing a handheld device with the admirable intention of boosting productivity, the employee has unwittingly committed to a wireless network. As the devices proliferate among the enterprise's user community, IT finds itself confronted with the daunting prospect of dealing with a plethora of wireless service providers using diverse technologies and serving a wide variety of geographic areas.

The PC Solution

A look back into the past provides an answer to this dilemma. Twenty years ago, after a few years of PC

anarchy, the IT organization finally stepped in and took control. They evaluated the vendors, set standards, made provisions for security, file backup and disaster recovery, and provided the support that their employees needed.

The same proactive stance is required in the case of these ubiquitous wireless devices. This time, however, the focus is less on the device and more on the network. Specifically, the CIO must be involved in selecting the best wireless network for these devices before the process of de facto selection by users gets carried too far.

By selecting a robust, high-speed nationwide network that will accommodate the latest in wireless devices—particularly for the most widely used application, wireless email—the CIO can eliminate a host of network-related headaches. At the same time, users are able to work with the latest in handhelds to increase their productivity and boost the company's competitive position in the marketplace. The key to all these benefits is a network that provides flexible, widespread, high-capacity coverage everywhere it is needed.

Motient's Nationwide Network

For example, with more than 2,000 base stations, Motient Corporation, based in Reston, Virginia, has assembled the largest and most fully deployed wireless network in the U.S. The network's coverage extends to 220 million people in the nation's top 430 metropolitan areas—all without roaming.



"We've had more than a decade of experience building wireless networks," said Dennis Matheson, Motient's CTO. "So over the years, as wireless has rapidly evolved, we have continually upgraded our network to keep pace. In the process, we've gathered a lot of experience in the best way to make this technology work, and we make it a point to pass that knowledge on to our customers."

"Right now," Matheson continued, "the leading app for wireless is email. People want to be connected no matter where they are."

Over its two-way, wireless data network, Motient provides its eLinkSM wireless email service, as well as BlackBerryTM by Motient. Both make use of the RIM Wireless HandheldTM,

the hottest handheld on the market. (See the sidebar on the next page for more on these two popular products.) >>



It's the Network

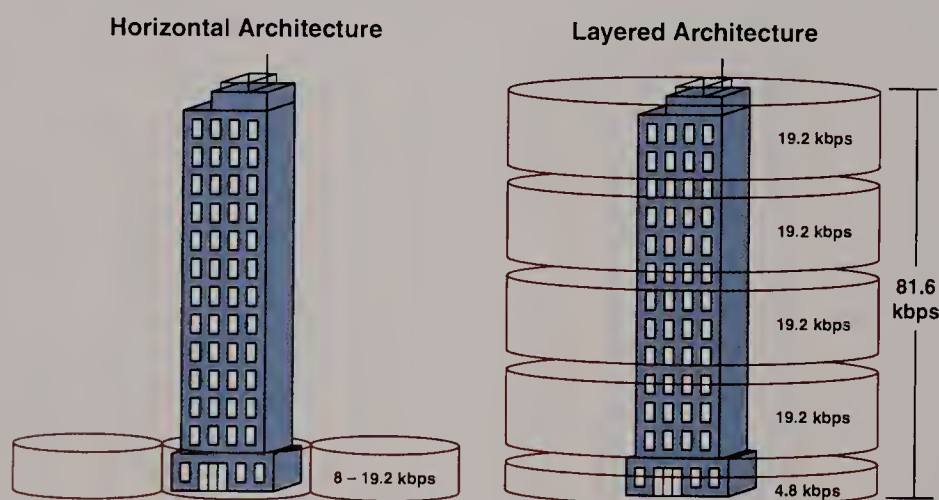
"For the users, being able to use an efficient, wireless handheld device is really important," said Matheson. "But for the CIO and IT managers charged with creating and maintaining a corporate communications infrastructure, it's the network that is a major concern. By being proactive—by choosing a reliable, secure network that provides the broadest range of coverage—CIOs can save themselves a lot of grief. It's one thing to meet your users' needs; it's a totally different story if you let users dictate infrastructure standards and protocols."

Matheson said Motient's constantly expanding terrestrial network provides a variety of features:

- ▶ broad national coverage
- ▶ the highest capacity of any nationwide wireless network
- ▶ the fastest aggregate transmission speeds
- ▶ the deepest in-building penetration (most network architects only think horizontally—Motient's architects think vertically as well)
- ▶ built-in fault tolerance for top reliability day in and day out.

"Most wireless data networks deploy their cells horizontally which is a fine strategy if your users are constantly on the move," said Matheson. "But most employees in a typical office environment want to use their wireless devices within the building as well as on the road. With a horizontal architecture, everyone is competing for the use of just one cell, which can play

Horizontal vs. Layered Architecture



Conventional cellular architecture is deployed horizontally, forcing stationary users to compete for cells. Motient's layered cell architecture provides more capacity per user, improving connectivity and response times.

havoc with connectivity and response times. Therefore, Motient deploys its cells vertically. This layered architecture makes sure that there is more than enough capacity for every user."

The Motient network combines that capacity with speed. Motient's packet data network operates at trans-

eLink and BlackBerry for Wireless Email

eLink is Motient's wireless email service, which allows users equipped with a RIM handheld to send and receive Internet email messages from virtually anywhere in the U.S. This portable email device also acts as an inbox, information manager, pager and calendar.

Users have several options. They can use eLink to wirelessly extend an existing Internet email account. In this case, eLink acts as an "agent"—it retrieves messages from a POP or IMAP mail server and forwards it to the wireless device. Users can also establish a new email address on the Motient network (username@2way.net), and email messages straight to another user's device.

BlackBerry by Motient, specifically designed for the Microsoft Exchange environment, combines wireless email with the RIM handheld and the Motient two-way data network. This solution makes the wireless handheld an extension of the user's desktop by providing full messaging capabilities.

The BlackBerry Enterprise Server provides centralized administration, performance monitoring, configurable handheld security attributes, and asset tracking tools.

BlackBerry Desktop Software runs on the user's desktop PC. This integrated suite of applications provides organizer synchronization, folder management tools, email filtering capabilities, information backup, and an application loader. Triple DES encryption technology meets stringent corporate security guidelines for remote email access.

mission speeds of 19.2 kbps. In some areas—for example, in New York—Motient layers several cells, allowing the network to reach an effective throughput today of 81.6 kbps and up to 211 kbps when fully deployed. This combination of speed and capacity allows the network to become a true instant messaging network, operating faster than even two-way paging networks that operate with a single layer.

"In addition to high speed and capacity, we're also

providing extremely reliable service even in highly congested areas like New York and Chicago," Matheson noted. "In Chicago, for example, we use one frequency over 110 towers—a technique known as single frequency reuse (SFR). Many other network providers use MFR—multiple frequency reuse—which allows users to communicate with only one base station at a time. The advantage of SFR is that no matter where you are—you could be 100 stories up and deep inside the building—you're still in range of four or

five towers. Your message is going to go through and your response times will be a lot faster."

A top New York-based law firm, with offices in several other major cities, is taking advantage of the Motient network and the eLink platform to provide its attorneys with an integrated email solution. Using RIM

Wireless Handhelds, the attorneys are able to leave the office without fear of losing communication with their clients, an absolute necessity in the legal industry.

One of the leading package delivery services is also making good use of the Motient network. In this instance, the company has equipped its drivers with specially designed devices in order to log and track packages while in the field.

Ready for the Future

The Motient network is highly flexible—currently more than 50 different devices are being used on the network, ranging from handhelds offered by RIM, Motorola and Panasonic, to specially designed devices such as the one used by the package delivery company. The Motient network allows the devices to transmit wirelessly to and from a LAN, server, host or the Internet.

"We're at the very beginning," Matheson said. "Right on the horizon are next generation wireless devices that will be smaller and far more versatile than today's offerings. We have the network already deployed that can accommodate these new offerings."

"For CIOs," he concluded, "it just makes sense to select the network they want in place before employees purchase these devices and commit to a de facto network. In the world of wireless communications, it is the network that makes all the difference." ◀

For more information on the Motient network, eLink wireless email service, and BlackBerry by Motient go to www.Motient.com or call 1-800-872-6222 ext. 7401.





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family or religion. For others, it's rock climbing. Others, it's their health." Johnson believes it's good business to help his employees find and live out their own balance. "We don't want you to sacrifice your life outside of work for Athene. We want to support you as a whole person," he says.

Such support is important to newlywed Tate Moore, a platform project leader who's been with Athene for two years. "Here, it is not assumed that you will work long hours," he says. "It does happen, but when it does there is very quick follow-up to recognize and honor the extra effort." That recognition takes the form of monetary bonuses and public thanks as well as added time off that must be taken.

Tooling and Training

Access to leading-edge technology and a commitment to ongoing training are other attributes of Athene's engineer-friendly culture. "We specifically chose the kinds of technology platforms top IT people are looking for," says Wolniewicz. These include a multitiered, Web-based architecture for Athene's applications, the widespread use of Java Beans and XML, and opportunities to experiment with Extreme Programming.

Athene ensures that its in-house equipment inventory is state of the art. "We don't skimp on tools for engineers," says Wolniewicz. "We probably spend around \$10,000 per engineer for software and hardware. Our people never complain that they don't have the tools to do

the job." The right tools mean less frustration and better career development, leading to greater job satisfaction and higher retention rates.

The company's training program is similarly aggressive. In-house classes are held every Wednesday and include such business-oriented topics as com-

Pete Dignan, president of ProtoTest, a Denver-based company that specializes in software quality assurance services, has found it easy to recruit for Athene. "People are looking for interesting technology," he says. "Quality people especially want a place that has some process discipline—something that's been

culture. "People today have lost the support systems they once had," he says. "As a result, they're kind of floating unattached, especially in IT where everyone is so young. When employers provide that support system, engineers are likely to say, 'Hey, I just found a home. These people care about me.'"

"Do your employees want to be a part of building something, or do they just want to draft off others, hoping for an IPO in nine months? You've got to weed those people out."

—ATHENE PRESIDENT AND CEO ERIC JOHNSON

petitors' offerings and product improvements. "Lifelong learning is a strong part of our culture," says Moore. "It's another facet of being balanced. If you have an interest in an area, Athene wants you to go after the information, and they'll support you along the way."

Money Can't Buy You Love

Athene doesn't skimp on salary and benefits, but neither do these take center stage. The company continually monitors compensation levels in Boulder and throughout the industry, making adjustments as necessary. Still, "money alone doesn't make people stay," says Johnson. "You've got to understand what motivates them. Do they want to be a part of building something, or do they just want to draft off others, hoping for an IPO in nine months? You've got to weed those people out."

lacking in the dotcom craze. They want managers who have a plan and are sticking to it."

CIOs running more traditional IT departments can learn something from Athene's success, Dignan says. "The same challenges face every IT manager. How do you differentiate your organization from others? Why would an IT professional want to join? Why should she stay?"

Wolniewicz has a ready answer: "The things that attract engineers are largely independent of a company's end-business," he says. "The principles we've implemented apply across the board: technology opportunities, a caring work environment and top-quality coworkers."

Roger Herman, a management consultant and CEO of Greensboro, N.C.-based Herman Group and the author of *Keeping Good People* (Oakhill Press, 1999), underscores the importance of a caring corporate

Talk about caring can seem saccharine, but such a culture has a solid business rationale. "I've been told that I should consider myself lucky just to have people coming through the door," says Johnson. "To me, that's hogwash. A technology business is all about people. It is suicide not to treat people with compassion and integrity."

The clearest indication of a strong corporate culture is that employees are aware of it. Moore says Johnson's vision is what attracted him to Athene in the first place. "It was clear that Johnson wanted a culture and wasn't just going to let one develop," he says. In turn, Moore has developed loyalty: "I'm sure something could entice me away, but I can't imagine what it might be."

Mark Gordon is a freelance writer in Barrington, R.I. He can be reached at markgordon@att.net.



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client crisis on way to
meeting in Tucson.
She goes back to office.
She misses her flight.
She misses her meeting.

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client crisis on way to
meeting in Tucson.
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crucial information from
company intranet.
Then she rallies her team
via e-mail.
She makes her flight.
Problem is solved by takeoff.

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HOT Seat

HINDSIGHT | DENNIS BENNER

Big Stuff

DENNIS BENNER left Fluor, the world's largest engineering and construction company, last year after serving as CIO for more than five years. Now an executive vice president at Autobyte.com in Irvine, Calif., Benner oversees corporate strategy and international partnerships for the online automobile marketplace. He reflects on the job of CIO, the old-economy/dotcom dichotomy and the importance of *stuff*.

CIO: What does it take to succeed as a CIO?

Benner: First, CIOs need to be able to take both a big-picture and small-picture outlook at the same time. They need to ask: How are we using IT to improve the overall competitiveness of the enterprise, and how are we using it to get costs down this quarter? Second, CIOs have to have a systemic view—to recognize how what they do affects the corporation. CIOs have to be sensitive to the fact that solving a problem in area A may create a bigger problem in area B. Third, successful CIOs have to listen carefully, with the whole system in mind, and learn to deal with conflicting objectives and make tradeoffs.

What happens when communication among departments breaks down?

When a company is spending significant money in IT investments, the relationships between a CIO and other executives can



be less than tranquil. But that's true for any executive—finance, sales, marketing, strategic management, manufacturing—who's doing something challenging. When I hear IT people talk about how tough life is and how they aren't fully appreciated, I say, "Get over it."

How should CIOs communicate with other executives?

CIOs should focus on listening. Also, they should rarely use technical terminology. Effective CIOs use analogies, metaphors,

stories and examples. The CIO has to speak two languages. When you're dealing with your IT staff, you want to use the appropriate language dealing with compilers, macros and so forth. But when you're dealing with other executives, you want to use words like *stuff*. What *stuff* conveys is that it's not important for the non-IT executive to worry about particular details behind the word.

What's the difference between working for a traditional

company and a dotcom?

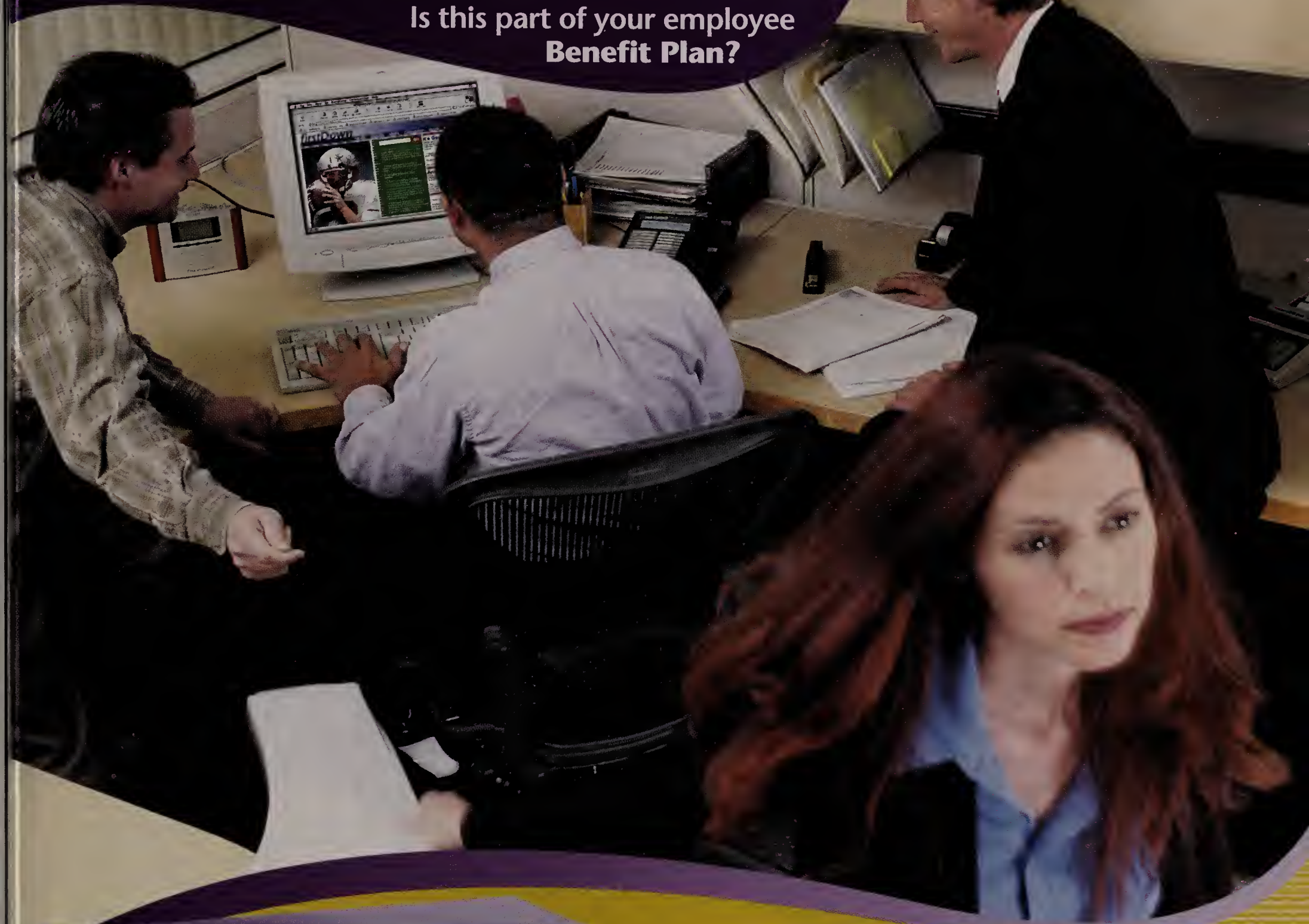
I think it's time to get past the idea of old economy/new economy. Why do we call this e-business? When we do business on the telephone, we don't call it t-business. When we do it face-to-face, we don't call it F2F business. We should just call it business. Both Fluor and Autobyte.com realize the inherent advantages and pitfalls of IT. By this time, both have it pretty well-woven into the fiber of their companies.

—David T. Gordon

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HOT Seat

HANDS ON | SUSAN H. CRAMM

The CIO as Valet

Why you should follow the fiduciary model of IT management

IN MOST ORGANIZATIONS, the CIO job is not a lot of fun. The job is hard—harder than it should be. I've been a CIO, and I've been a CFO and a general manager, and the other executive positions were easier every day of the week. Sure, it's an honorable job that pays well and ensures employability. But believe me, there are easier ways to earn a living. In fact, many of my next-up-for-the-CIO-position clients aren't even sure they want the job.

If you want insights into the CIO reality, listen to the language. Last week I learned a new term from one of my clients, the CIO of a major transportation company. She talked about "valet IT." Valet IT happens when business executives drop off their technology wish, go do their "real job" and expect the solution to be waiting at the

change embedded in my request. My goals for improved customer service and labor efficiency couldn't be achieved by IS alone. These shifts required significant process and behavior change on the part of my managers and their teams.

The reason the CIO job isn't a lot of fun (some would say impossible) is that it's too big. CIOs and their teams are operating not only as technologists but also as surrogate users. They are trying to do a lot of the work their business counterparts should be doing, such as identifying where IT should be invested, outlining the investment justification, managing the change program, arbitrating among conflicting interests, redesigning the business processes and retraining the frontline performers. At the same time, they are supposed to be designing IT architectures, building infrastructures, assembling and motivating a pool of technologists, providing excellent customer service and delivering high-quality, secure, low-cost operations. My non-IS positions were easier than my CIO

role because I did not have to bear the lion's share of responsibility when I partnered with other executives. Each of us understood our respective roles and accountabilities.

Companies need to stop viewing IT as a custodial function. CIOs can no longer operate as surrogate IT users because the job has grown beyond their expertise. IT transformation is largely made up of non-IT work—as much as 80 percent of the total work, according to DMR Consulting. In addition, your executive counterparts are much more technology-

savvy than they used to be. You need to get out of their way. CIOs need to go far beyond the typical solutions for aligning IT with business strategy—methods such as senior-level sponsorship, full-time project participation, colocation and project incentives. These solutions look a little anemic when you understand how big a problem valet IT is. It's time to be bold. In the words of Roger Enrico, chairman of PepsiCo, "When the execution has to be perfect, the idea isn't big enough." The big idea here is to transition

curb when they are ready. As a general manager, I tried to drop off my IT wish when I asked my CIO to implement a labor scheduling system for my restaurants. When he asked me to ante up and devote the resources necessary to manage the program and ensure its success, I backed off. He wasn't running a valet service; he knew (and I was reminded) that I would need to manage the IT-enabled business



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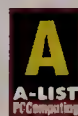
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HOT Seat

from the custodial model of IT—that is, doing IT on behalf of the company—to the fiduciary model, in which you ensure that the company does IT right.

In doing this, you are not blazing a new path. Most financial and HR departments have been operating in this mode for years. The CFO's office doesn't manage every financial decision

that HR manages employees badly, but in most companies you hear general managers complaining that IS has not developed good systems.

In fiduciary IT management (a.k.a. federated IT and IT democracy), business units are responsible for the “what” of IT, while IS is responsible for the “how.” The business units exe-

cution and security, and second, monitoring project status and benefits realization. He saw an opportunity to become the company's preferred provider for services that benefit from economies of scale, such as operations, call center, procurement and education. Finally, he defined HR standards for IT staff, including professional

going and can help you make this new organizational strategy a reality.

■ **Write your elevator speech.** Test your ideas with other CIOs, your peers, your IT staff and your CEO.

■ **Conduct a pilot test.** Make sure you put your best foot forward by collaborating with a division head who sees the future. Use the results to refine the design and build momentum.

■ **Get out of the way.** If your sales efforts have been successful, the other division heads will be pitching the idea back to you. Now your challenge is to mobilize your organization and ensure that the division heads are ready to assume responsibility for day-to-day IT management.

Your real job is to help your business partners learn how to provide for their own IT needs. You need to apply your technology skills to designing and developing the IT architecture necessary for this self-provisioning. In essence, you are disintermediating IT to accelerate its delivery to the business. Along the way, you'll get back your “real job” of technologist and give up the less-than-satisfying, impossible-to-deliver role of parking attendant. **CIO**

Susan H. Cramm, formerly vice president and CIO of IT at Taco Bell and executive vice president and CFO at

Chevys, a Taco Bell subsidiary, is president of Valuedance, an executive coaching firm based in San Clemente, Calif. She can be reached at shcramm@aol.com.



PHOTO BY CHRIS CORSMEIER

Companies need to stop viewing IT as a custodial function. CIOs can no longer operate as surrogate IT users because the job has grown beyond their expertise. IT transformation is largely made up of non-IT work.

but instead ensures that the company's financial goals are well understood. The finance office then delegates the responsibility for achieving results to those who can influence the outcomes. Similarly, HR doesn't oversee each employee but instead defines the plans, policies and procedures necessary to ensure that the entire staff is managed well.

It makes good sense that technology should follow a similar evolution. After all, there are only three classes of resources that can be leveraged for success in organizations: capital, human resources and technology. Why should technology be managed differently than the other two? You can see the disparity by again listening to the language. People don't blame poor P&L results on the finance office or complain

cute their IT investment plan, and the CIO defines the rules on how the investment is managed. One large manufacturing company that sells via the Internet implemented this fiduciary IT approach by decentralizing its IS group and making the divisional CIOs report directly to the division presidents as well as the enterprise CIO.

The head CIO could then focus on how the organization invested and implemented technology. He also boosted IT investment by helping the division heads gain appropriate funding based on well-articulated business plans.

His technological role was one of high-level leadership, first leading the development of the architectural standards, designs and infrastructure necessary to ensure enterprisewide integra-

development and succession planning.

If you are interested in moving toward a fiduciary IT organization, take the following actions:

■ **Get comfortable with the concepts.** Study your finance and HR departments to see how they have delegated responsibility yet still maintain the authority necessary to ensure that resources are managed to achieve their goals.

■ **Convince yourself.** Spend some time pondering why it's necessary for the business units to assume responsibility for IT. Not until you're convinced can you convince others.

■ **Sketch out the solution.** Further develop these ideas with the CFO and head of HR. If you draw the parallels, they will understand where you are

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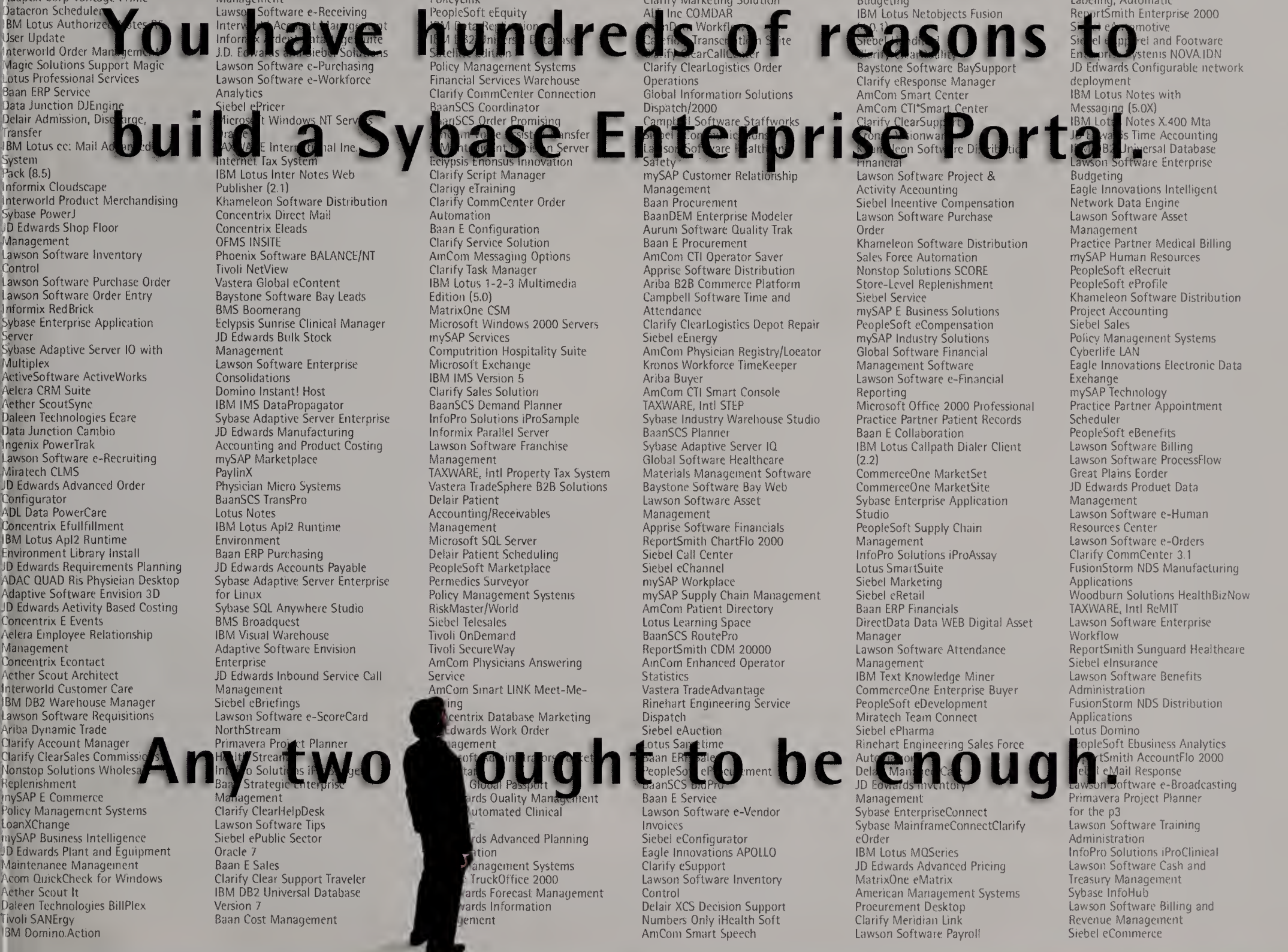
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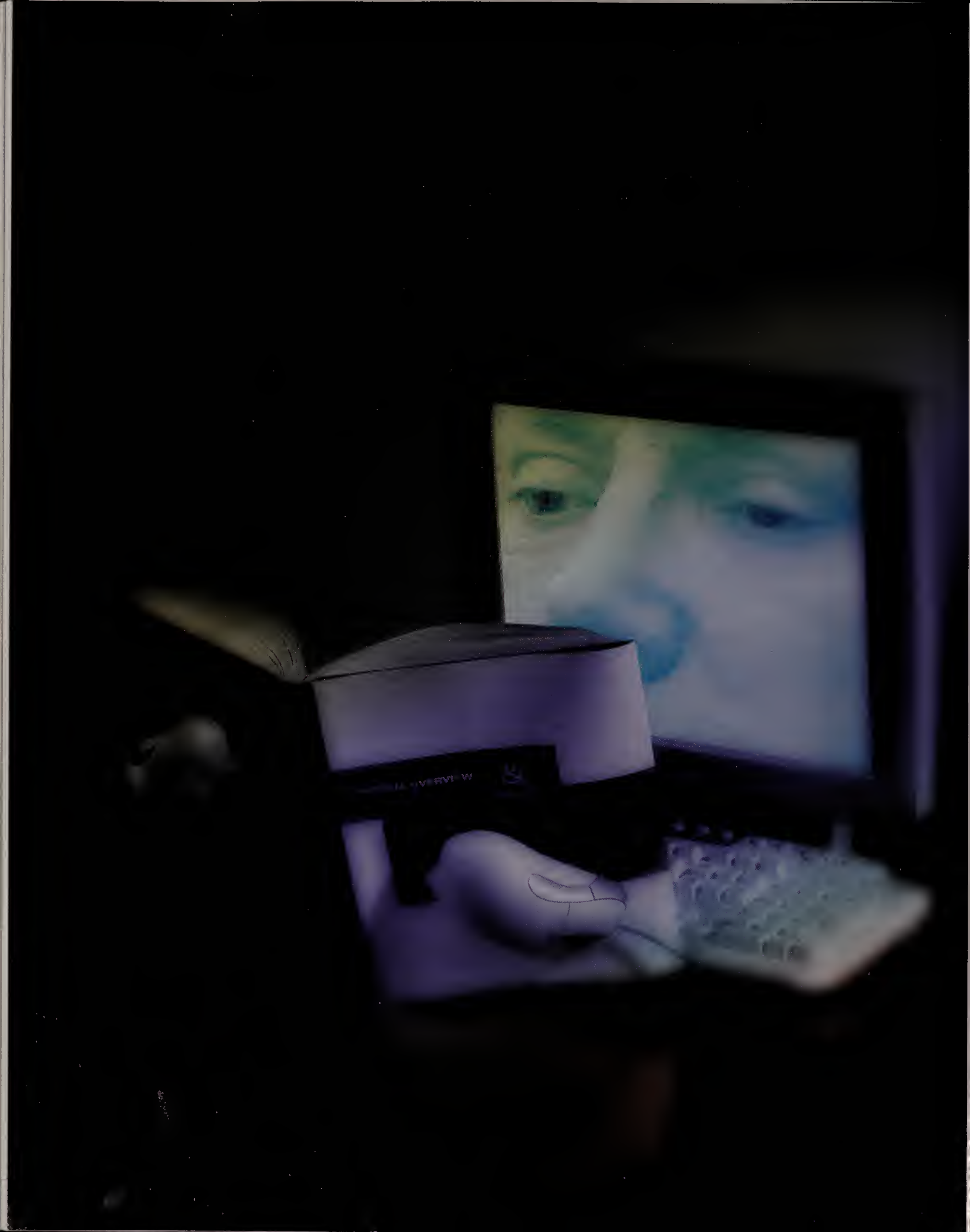
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A CIO SPECIAL REPORT

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You know the hype.

Wireless will change everything. And you know it's not true. So we went looking for the here and now of wireless technology. What works and what doesn't. Where the potholes are. The risks.

The truth is, wireless applications can be useful, but there are limits. At Celanese Chemicals in Dallas, handheld device-toting sales agents can tell their customers what's really in stock right then and there. Handy, that, although the dollar ROI has yet to be determined (see "The Wisdom

of Starting Small," Page 80). CSX Technology, a railroad technology provider in Jacksonville, Fla., extended a Web-based shipment locator application to wireless device users—both customers and staff. Again, it's nice to know where the boxcars are at any given moment, but the ROI has yet to materialize.

Security concerns, meanwhile, prevent CSX Technology from letting executives access e-mail from their handhelds—a wary attitude supported by our experience wandering Boston with a wireless modem (see "Time to Get Nervous," Page 102). To get a consumer's eye view, we sent a

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A Clear-Eyed View

reporter to navigate Manhattan's wireless scene armed with a Palm V, an OmniSky modem and an Internet-enabled mobile phone. She found her way around (and got dining tips from Zagat's) but nearly lost her mind when she tried to make a purchase (see "Wireless in Manhattan," Page 90).

As researchers such as MIT's Michael Dertouzos foresee mobile wireless technologies becoming ubiquitous (see "The Invisible Ball and Chain," Page 132), our reality-check survey showed most of you puzzling out familiar chal-

lenges such as systems integration, security and a hodgepodge of standards (see "Decidedly Not Gee Whiz," Page 130). We also sought to learn from the experience of companies like United Parcel Service of America whose urgent business needs prompted it to explore the technology—without any standards for data transmission—back in the 1980s (see "Survival Tips from the Pioneers," Page 114).

The wisdom gained from these early adopters and throughout these pages shouldn't surprise you: Start small. Learn. Measure the risks. Ensure there's a business benefit. Then go.

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ADEXA
K N O W M O R E

While it's definitely time to get moving on wireless, it makes sense to take it slow

BY SUSANNAH PATTON

A S A SENIOR I.T. EXECUTIVE with Celanese Chemicals, William Schmitt is used to being the invisible man at the dozens of industry and technology conferences he has attended over the years. "Chemical companies don't normally talk about leading-edge stuff," Schmitt says with understated humor. "We listen and ask questions, but other people usually pass us by."

Not anymore. At a technology conference in Durham, N.C., in late November, Schmitt shook hands with crowds of IT executives who peppered him with questions about his latest project. The reason for his new visibility: wireless. Celanese is one of a handful of old-line manufacturers that are taking initial steps toward hooking their remote sales force into their ERP systems to provide constant, real-time company information over mobile phones, Palm devices and other wireless gadgets. "The use of SAP and wireless in the same sentence stirred up tremendous interest," says Schmitt, who oversees the

Reader ROI

- ▶ Discover how wireless can supplement your technology menu
- ▶ See how three diverse businesses approached the wireless space
- ▶ Find out why companies are not rushing into mega wireless projects

PHOTO BY DAN BRYANT

The Wisdom of



Celanese Chemicals'
William Schmitt *now*
finds himself a sought-after
speaker on wireless ERP.

Starting Small



APPLICATIONS

SAP system for the U.S. arm of Frankfurt, Germany-based Celanese Chemicals. "The notoriety is a big change for us."

While the initial hype surrounding the wireless Internet has calmed—and predictions for mass consumer adoption have largely fallen flat in the United States—wireless applications have a new focus: smartening up the business side. Companies such as United Parcel Service and FedEx, whose employees have used wireless radio devices for the past decade, have led the charge by launching wireless applications that allow consumers to track packages and find information on the nearest package drop-off locations. (See "Survival Tips from the Pioneers," Page 114.) Now, many companies are turning their attention toward finding ways to improve productivity and streamline customer outreach. Many observers agree that wireless holds tremendous potential for helping workers—be they doctors, home-care nurses, real estate agents, sales managers or utility reps—conduct business more effectively outside the office. But thus far, only a few companies have ventured into this brave new territory. Celanese and MGM Studios in Santa Monica, Calif., for instance, are providing their sales force with wireless access to their companies' ERP systems and allowing employees to check pricing and order status with cell phones and PDAs. Doctors, including those at HealthFirst Medical Group in Portland, Ore., use wireless devices to access surgical schedules and patient information.

It's too soon for most early movers to show actual savings from their investment in wireless technology, but the promise for improving customer service and boosting the bottom line is substantial, experts say. At Celanese, for example, salespeople can check availability on a specific chemical, thereby assuring that the company doesn't lose a lucrative sale, Schmitt says. Without such instant information, a salesperson might not be able to promise the customer that he could ship it right away.

Recent statistics show a growing interest in wireless business applications. By 2004, 65 percent of Global 2000 companies are expected to offer their mobile workers wireless access in order to perform critical applications, according to a recent study by Gartner in Stamford, Conn. But as with consumer applications, businesses interested in wireless face a slew of hurdles that include security concerns, spotty coverage across the country and a tangle of technologies that make choosing devices and standards a complicated guessing game. What's more, wireless Internet access is comparatively slow. Today's digital cell phones access data at 9,600 to 24,000 bits a second, a fraction of the speed of broadband or even the average dial-up modem. Accessing a website on a wireless device can take minutes, instead of the seconds most PC users are used to.

For all of these reasons and perhaps because the consumer applications haven't lived up to their promise yet, companies seem to be taking a measured approach to the technology. Many are looking at the potential return on investment instead of blindly jumping into the fray. Car rental company ANC Rental in Fort Lauderdale, Fla., for example, is in the process of updating wireless handheld devices that employees have used to check in rental cars for the past decade. But ANC officials are carefully analyzing the potential ROI from implementing wireless devices that can serve as location devices in their cars. "We need to guard against deploying technology for technology's sake," says Rickie Hall, ANC's CIO.

Although wireless may not yet be useful for everyone, experts predict that competitive pressures will dictate the adoption of wireless strategies by most companies. And IT leaders need to get moving now. "Companies need to get started with pilot wireless programs, if only to educate themselves," says Phillip Redman, a research director at Gartner. "Then, when the technology is really mature and costs less you'll have the architecture in place."



Money on the Run

Fidelity Investments was one of the first major U.S. companies to aggressively promote a wireless offering to its customers. Still, when Joseph Ferra was developing a wireless strategy for Fidelity Online Brokerage two years ago, he sensed skepticism from the financial powerhouse's top management. "They asked me, 'Shouldn't we be waiting for a faster network or a cheaper device?'" says Ferra, sitting at a table strewn with gadgets in his 26th-floor office, overlooking Boston's skyline. "My answer was always an emphatic no. We need to get out there now, establish ourselves, evolve with this technology and then be able to dominate it."

Ferra, a senior vice president at Fidelity who has led the brokerage's ambitious wireless effort since its 1998 start, no longer gets

PHOTO BY JOHN SOARES



tial amount to building wireless technology and marketing that strategy. Fidelity started by offering wireless services to only its wealthiest and most lucrative clients.

Fidelity's wireless initiative emerged when its technical group developed an automatic system to alert technicians to computer program bugs. "We thought, If we can do this for internal folks, we could also alert our customer base to market conditions," Ferra says. Two years later, Fidelity launched its first "instant broker" service, sending account balances and quotes to clients by pagers.

By 1999, the company was offering real-time stock quotes and allowing actual trades via wireless devices. As an early mover, Fidelity struggled with technology roadblocks such as problems with the speed of the network and security concerns. When the company first looked at encryption, it found little on the market that could guarantee end-to-end security for financial transactions. At the time, true end-to-end security required that encryption be embedded in the device, which slowed down transmission speeds and increased prices. Finally, using technology from Certicom, a Hayward, Calif., wireless security company, Fidelity, working with Bell South, helped

before they become mainstream. The company spends \$2 billion a year on technology, far beyond the \$500 million spent by its closest competitor. The Fidelity wireless site is embedded in several devices, which means its service is easier to use than many of its competitors. Fidelity officials hope that their prominence will help them bring in new customers as well as retain current clients.

"Wireless is the second coming of the Internet," Ferra says. "If you don't have a wireless offering in the future, it will be very difficult for you to compete in this industry."

Ferra's zeal may be a bit premature. While Fidelity leads the click-and-mortar brokerages with 81,000 wireless accounts, that's only a small fraction of its total 16 million retail accounts. And a recent survey by Gomez Advisors in Waltham, Mass., shows that 74.2 percent of "active" Web bankers were not interested in wireless financial services. "People can live without wireless trading," Gartner's Redman says. But, he adds, that brokerages are obligated to launch wireless offerings to keep high-end customers.

Fidelity wouldn't argue with that premise. "It isn't always about volume; it's the type of customer," says Steve Elterich, president of Fidelity's e-business unit. As hordes of competitors—including Charles Schwab—rush to catch up, Fidelity is forging ahead with wireless to maintain an advantage by offering personalized services. And the company is starting to install wireless LANs in its offices as well as wireless gateways at employees' homes so that they can access company information quickly.

Even so, the data offered to wireless clients needs to be carefully chosen so that it does not inundate the user. "The wireless Internet is not the Internet wireless," Ferra says. "This is not about taking Fidelity.com and squishing it on to a device."

Let There Be Light

For the past 25 years, Florida Power & Light's (FPL) repair crews, while crisscrossing the Everglades, have kept in touch with its Miami home base using handheld radio

"Wireless is the second coming of the Internet. If you don't have a wireless offering in the future, it will be very difficult for you to compete in this industry."

—Joseph Ferra, Sr. VP, Fidelity Online Brokerage

those kinds of questions. The brokerage was the first in the United States to offer wireless trading, and its services are now prominently displayed on all of the most popular devices, including Research in Motion's BlackBerry pager, the Internet-enabled Palm VII, Sprint PCS phones and Verizon networks. Although Fidelity is not revealing numbers related to its wireless initiative, the company has obviously invested a substan-

Research in Motion develop an encryption system that compressed messages so that they could be sent securely and rapidly. By proposing the additional security measures, Fidelity was able to gain an exclusive display on the BlackBerry device.

Fidelity's massive IT organization, which makes up one quarter of the company's 32,000 employees, has allowed the company to experiment with new technologies



APPLICATIONS

devices. Communicating over the utility's private radio network, they have responded to emergencies during storms and asked for directions from dispatchers.

The proprietary radio system has worked well. But new wireless technologies with faster transmission speeds promise to improve the operations by providing added information about a crew's whereabouts. So

works. "We're trying to use wireless to extend our reach," says Dennis Klinger, FPL's vice president and CIO. "The fact that our computer systems know where our vehicles are and what their capabilities are means our customers get better services." When FPL crews are busy during a severe storm or hurricane, for example, dispatchers are often left scrambling to arrange repairs during widespread power outages. With the new system, they can more quickly find crews close to trouble spots and determine if the vans have the right equipment on board to do the job.

Although Klinger and his colleagues aren't talking about ROI just yet, they are convinced that new wireless technology will pay off by increasing the efficiency of the utility's workforce. "If we can get the

tions governing rate analysis, meaning that they have to install costly phone lines to take daily and weekly samples. In addition, the utility believed that by automating the meter reading process it could improve its service to high-paying commercial customers.

Two years ago, a team of FPL executives convened to examine using wireless networks to take these frequent readings and replace the utility's aging Solid State data recorders, which measure the amount of energy a customer is using and are read by human meter readers or by telephone lines. The group was just about to give up on its search for a wireless meter reading device when they heard from friends at Duke Power Co. in Charlotte, N.C., about a simple but efficient wireless device that could be installed right on the meter. Now FPL is in the process of replacing several thousand meters with wireless devices from SmartSynch of Jackson, Miss., which encases its

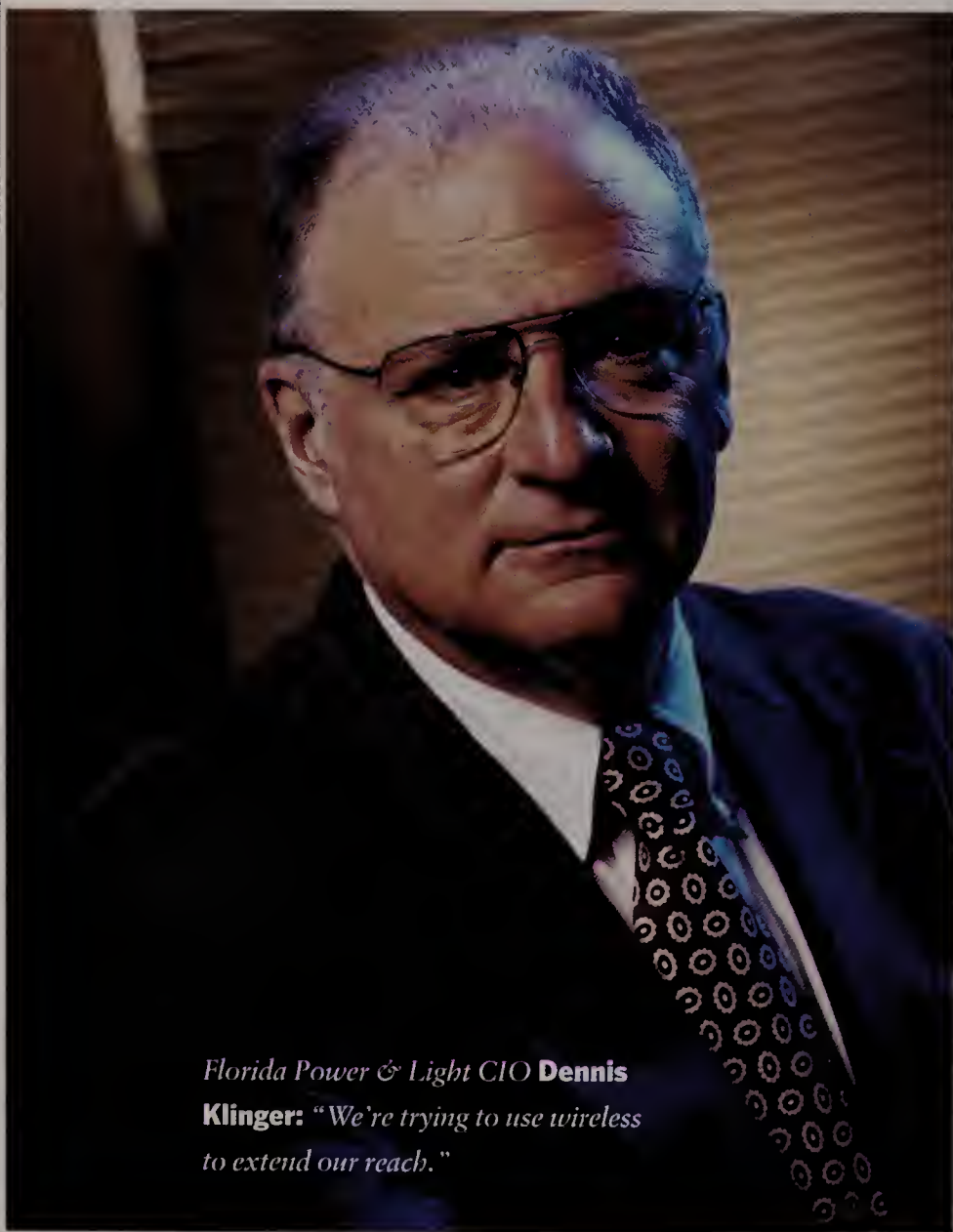
When it comes to meter reading, Florida Power & Light's investment in wireless technology seems hard to justify.

right people to the right place for our customers, the chances are that we will be able to make repairs and service the customer more rapidly," Klinger says. By the end of March, FPL repair crews will be using entirely new mobile

intelligent systems in devices made by Siemens. The meters can be read wirelessly using Skytel's two-way pagers.

After installing SmartSynch's computer system and a Windows NT server, FPL can automatically record meter data on a regular basis. The system not only takes wireless meter readings but can also alert FPL and customer personnel of power interruptions 24 hours a day. At 2 a.m., for example, the system can send pages to a customer's electrician, says Ed Brill, FPL's power quality business manager. "He'll get the specific information, and he can decide what to do. Sometimes, a problem can be corrected before a customer knows of the problem."

Despite their enthusiasm, Brill and his colleagues acknowledge that wireless technology still poses some serious challenges. Gaps



Florida Power & Light CIO **Dennis Klinger**: "We're trying to use wireless to extend our reach."

FPL is investing about \$35 million to upgrade its voice and data wireless infrastructure and will also purchase mobile equipment for each van, which will allow dispatchers to automatically determine each vehicle's location. At the same time, FPL is expanding its wireless strategy to include serving some of its 7 million customers, by installing "smart" meters that will allow the company to take electricity usage readings and monitor power quality over wireless net-

radios, and by the end of the year they will have all new data equipment, including specially outfitted rugged laptops with wireless modems.

When it comes to meter reading, the investment in wireless technology seemed harder to justify, at first. Florida's mild climate means the utility can cheaply hire meter readers to visit customers year round. Still, the utility must read some meters more regularly in order to comply with regula-



remain in coverage where they have to install a phone line to read a meter. By December, they had installed more than 200 wireless meters out of a planned 4,000. And although SmartSynch has laid out architecture that would allow FPL to install its smart meter technology for residential customers, FPL can't yet justify that investment. "For the moment, the percentage of customers with wireless meters is small," says Ed Malemezian, data collection manager for EDMPro, a division of FPL. "But by gaining this experience with wireless, we feel we're ahead of the game."

A Chemical Reaction

Celanese Chemicals doesn't consider itself a technology trendsetter; after all, it's in an old economy business, making chemical solvents like those that go into paint. Like many in the industry, Celanese only recently started warming up to e-business, receiving its first order over the Web in September. Salespeople build careful relationships with clients and are reticent to pull out laptop computers when they're in the middle of a negotiation. "We're old-fashioned," says Schmitt. "Normally, we're conservative and really cautious."

When it comes to wireless technology, however, Celanese stepped out of character and pounced at the opportunity for a pilot run. Before wireless had even crossed its mind, Celanese decided to buy software from Haht Commerce of Raleigh, N.C., in February 2000 to allow its salespeople to check product availability, pricing and order status from the company's SAP R/3 system over the Web. Almost by accident, Schmitt noticed that one of the features of the software contract was wireless. "That planted a seed," he says.

With help from GadgetSpace, a Raleigh, N.C., company, Celanese launched a pilot project last October to allow its 35-member sales force and 25 customer service employees to get information from the SAP

system via wireless devices. GadgetSpace, a spinoff of Haht, takes information from SAP, already available to the Web browser (in HTML or XML), and translates it into a format designed for a handheld device, using handheld devices markup language, wireless markup language and HTML. (See "How to Speak Wireless," Page 122.)

Wireless Tips

1. Take measured steps and focus on ROI.

"Don't jump off the high board," says Booz, Allen & Hamilton's Sajai Krishnan, head of venture services in communications and technology, who encourages clients to start with pilot projects.

Some vendors are offering wireless packages with big promises and large price tags. Don't go down that path if no concrete ROI is in sight.

2. Avoid getting locked into one wireless technology.

With the state of wireless still in flux, it's better to hedge your bets by trying out several technologies at once. Well-known consultancies can help find the best-of-breed package rather than one end-to-end product that could be soon outdated.

3. Outsource.

Use a systems integrator and consider tapping an ASP to host your wireless service. CIOs already face a staffing crunch. Add wireless, and it becomes even harder to find people with expertise in this emerging area.

—S. Patton

Initially, salespeople tested the service over almost every device available, including the BlackBerry pager, Hewlett-Packard pocket PCs, Palm V with an OmniSky modem, Palm VII and Sprint PCS phones. The early results, although anecdotal, were largely positive. "One of our guys had never seen a PDA before this, and he learned it in two hours," Schmitt says.

Schmitt stresses that he doesn't view wireless as a primary means of getting information regularly. But it could have an impact on the company's business. Celanese Chemicals receives 50,000 orders a year, and each one is sizeable—total yearly orders

reach almost \$1.5 billion. At a holiday party, Schmitt says, a saleswoman received a phone call from a customer and was able to answer the question right on the spot. "It wouldn't take many lost orders to pay for a program like this," he says. In addition to finding customer information, salespeople can go into the SAP system and track the location of tank cars carrying chemicals to customer destinations.

In the coming weeks, Schmitt expects to choose one device and wireless Web service. For the moment, he's leaning toward the pocket PCs that can run on Windows CE. While he is optimistic about the pilot's outcome, Schmitt does express some concern about security. Even if the system is password protected, he expects that some devices will be lost. "Our top security concern is that we'll leave them in a hotel or rental car," he says.

Because wireless was an added feature on an Internet software package, cost was in the tens of thousands instead of hundreds of thousands, Schmitt says. Once the overall system was installed, each wireless device cost between \$500 to \$1,000 to purchase and outfit with the correct software, not including the additional cost of maintaining the service. "If the system saves just one order, it will practically pay for itself," Schmitt says. The system was also quick to install because the company had already put its SAP system on to the Web.

Schmitt doesn't expect that wireless will change his business substantially. "This is not mission critical—it's supplemental," he says. But after years of working in obscurity, he admits that he is enjoying the attention Celanese is suddenly getting from colleagues and competitors around the country. "It validates the work we do," Schmitt says. "It's confirmation that we're working on the right stuff." **CIO**

Tried any wireless experiments recently? Let Senior Writer Susannah Patton know at spatton@cio.com.



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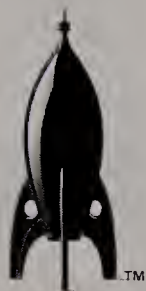
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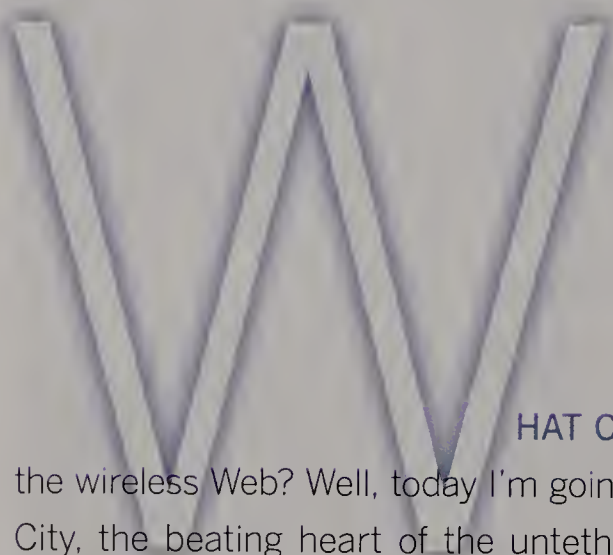
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wireless VIEW FROM THE STREET

Wireless

Our reporter went unstrung to the Big Apple with modest plans and found both frustration and fun

BY SUSANNAH PATTON



WHAT CAN YOU REALLY DO—right now—on the wireless Web? Well, today I'm going to live *la vida* wireless in New York City, the beating heart of the untethered world. Armed with a Palm Vx Handheld with an OmniSky modem and a Sprint PCS cell phone, I'm going to schedule meetings, confer with my editors, arrange appointments, check my stocks, make dinner reservations, buy presents for my family, and get in, out and around the Big Apple with Jetson-age ease. That is, I'm going to try.

8:00 a.m. Outside my 5th-floor window at the Soho Grand Hotel looking

Reader ROI

- ▶ Get a consumer's view on the wireless Internet
- ▶ See how mobile commerce can be more trouble than it's worth
- ▶ Learn how New York entrepreneurs are struggling to find killer wireless apps



8:00 a.m.



9:00 a.m.

PHOTOGRAPHY BY FURNALD/GRAY

in Manhattan



Our woman in Times Square, *Susannah Patton,*
makes her way uptown.

VIEW FROM THE STREET

down on Canal Street, New Yorkers bundled in hats and scarves on this December day are scurrying between the gridlocked cars. I fire up my Palm and Sprint PCS phone with wireless Internet. The batteries are charged, and I am ready to take on Manhattan. First, however, I need a cup of coffee. Where to go? I'm sure there are dozens of coffee shops in the area, but I need to head uptown to 44th Street for my first meeting with Mark Caron, CEO of MobileSpring, a company that develops wireless applications. I remember that the

town," and quickly flags down a taxi. Hurtling up 6th Avenue in the cab, I click on the Starbucks locator on my Palm using my stylus. I type in the address of my first meeting in Palm's Graffiti writing system. Within seconds, two Starbucks addresses pop up, the first on the corner of 6th Avenue and 42nd Street, where I ask the taxi to stop. Sure enough, there's the Starbucks. Unfortunately, it has no tables. The locator doesn't provide those kinds of details. "There's another one three blocks uptown," a woman says

and raspberry scone in hand, I check my agenda and click on Barnesandnoble.com's site on the Palm. I figure I can buy a book or CD and have it delivered to my hotel by the end of the day, thereby participating in the dawning age of mobile commerce, or m-commerce. In the middle of searching through CD titles, however, a discouraging message pops up on my screen: "Our apologies. Purchasing from the Palm is currently unavailable. Please visit our webpage to complete your order." Hmm. I could just as easily locate a Barnes & Noble store



Coffee first: Wireless apps let our reporter locate Starbucks, chat online with the office (see below) and find directions to her uptown meeting.

Starbucks Coffee Store Locator, which I have downloaded to the Palm, is, according to Palm's website, one of the most popular applications along with an e-mail service called ThinAirMail.

In front of the hotel, I ask the doorman if it's possible to call a cab on a Palm. He laughs and says, "No way—not in this

to me with a knowing look.

9:00 Walking along the avenue, I type a brief message to my editor on my mobile phone, using AOL's Instant Messenger system. "Starbucks located," I write. My phone instantly starts beeping. "Cool," he responds. We could have just called each other, of course, but he's in the middle of a meeting. This is pleasantly subversive—I can see why teens in Scandinavia are addicted to text messaging. I would have loved this in high school. It's a little awkward at first, though. (Typing the word *hello*, for example, involves 13 keystrokes. To type the letter "L" you need to hit the "5" key three times.) The exchange is interrupted by a call from my husband, who informs me that everything is fine on the home front. I promise gifts.

At the second Starbucks, with a *grande* house coffee

using the OmniSky service and go there. I realize that I am going to be late for my meeting, so I quickly tap on my Palm to help me find directions to MobileSpring using a service called MapBlast.

9:45 I walk out into the cold. "Head north," the instructions begin. Which way is north? I ask a man in a trench coat and hat standing next to me. "That way," he grunts, throwing his arm up for emphasis. I arrive at 120 44th Street after taking only one wrong turn.

10:10 In the cramped, dingy offices of MobileSpring, CEO Mark Caron talks about the promise and limitations of wireless communication. Caron says his developers are working on applications that people can use now, such as instant messaging between different types of devices. "There's been a 'gee whiz' factor with wireless," he says. "We need to focus on what's really useful, such as e-mail and messaging, and news and stock information." New York City is emerging as a center for wireless Internet applications, financing and advertising, Caron says, because it's ideally



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VIEW FROM THE STREET

located for deals between the United States and Europe, where the wireless phenomenon is stronger.

Caron, who started his career in General Electric's IS department and went on to help found Omnipoint Communications, says he uses his Internet-enabled Palm VII (he's since moved to a RIM BlackBerry) to check traffic information during his commute from Ridgewood, N.J., or to check for flight delays when he's traveling. "I'm constantly comparing how long it takes wirelessly, and I get mixed results," Caron says. For the moment, he says, most people don't buy things or conduct other transactions like banking or reserving a restaurant table on the wireless Internet. Wireless modems are slow, and coverage is often spotty. In six to 12 months, however, he predicts that we'll be using mobile phones to pay parking meters or buy a Coke from a machine, like they can in Finland. Clearly, we're not quite there.

11:15 I enter the subway and try to message my editor again on my cell phone. "In subway and have a signal," I write. "Gotcha, what line are you on?" "The N train," I respond. By the time I reach the subway platform, the signal is lost.

11:30 Even if I can't get my gifts wirelessly, I can at least take advantage of New

loaded several days before. After several seconds, MySimon.com comes up with a list of outlets (mostly online) that sell the digital camera for less. A burly store manager approaches me (and the photographer accompanying me) and tells us we can't take pictures in the store without approval from corporate headquarters. He looks like he means business. But as we start to leave, he pulls me aside and asks: "How do you like your OmniSky modem? I'm thinking of getting one myself. What do you think? Should I get one?" I evidently look like a wireless pro. I advise him to shop around.

Noon I try out the Where2Go Public Restrooms Locator application, a guide to the best public toilets in the city. It says Forbes Magazine Galleries has "very nice and clean" restrooms several blocks away with "deco/nautical themes." I don't have time to try these out, however. I'm going to be late for my lunch meeting.

12:30 p.m. After a brief subway hop, I hurry down Wall Street to meet my friend Caroline, who works for a dotcom. Her

31st floor of her building. "Take the elevator up and leave reality below," the Zagat's review begins. Sounds perfect.

From the Plaza Hotel's steps, where stiletto-heeled glitterati prance with cell phones, to Swedish telecom giant Ericsson's research and development "CyberLab NY" in lower Manhattan, the city is beeping and buzzing with gadgetry. Hundreds of Internet entrepreneurs are jockeying to discover applications that could change the ways we do business. Even as the Nasdaq crumbles, hosts of New York financiers are



Notes on the fly: A fold-up keyboard helps Patton jot down interview notes; wireless chat works at the subway station; seeking a gift.

York City's reputation as a mecca for electronics shopping. I enter The Wiz at 17 Union Square West, a well-known New York-area chain, and head for the camera counter. I kneel down to look at the Nikon Coolpix 950, priced at \$799. I pull out my Palm and tap on MySimon.com, a comparison shopping application I had down-

company's spacious offices—complete with mod furniture and lime-colored walls—don't reflect the tension brought on by recent layoffs. Sitting on a bright blue velour couch, we ponder where to eat while perusing Zagat's restaurant guide on my Palm. We consider an eatery called The 14 Wall Street Restaurant, located on the

focusing on the wireless Internet. Some of them are eating today at 14 Wall.

Ensnared at our table, surrounded by serious-looking financial types talking about the latest market troubles and postponed IPOs, I take out my mobile phone and Palm. Caroline tells me it's considered uncouth to talk on the phone in such a nice



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Where the future of e-Business takes flight

VIEW FROM THE STREET

restaurant. PDAs are probably OK, right? While waiting for our sesame shrimp and sautéed scallops to arrive, I try again to buy a CD for my husband. Caroline suggests the latest from a band called Radiohead. Even though I am in a top floor overlooking the Manhattan skyline, I am unable to get a signal to log on to the Barnesandnoble.com site. Seconds later, I successfully log on to my e-mail account and scroll through recent messages from the office. I realize I am completely ignoring my lunch guest.

decide to check some stock quotes. I take out my mobile phone and log on to the Web by pressing the "minibrowser" option and then Fidelity's site. The shares of my husband's company are higher in midday trading. My joy is tempered by the realization that the share price has fallen 32 percent since the year's high. Not only that, both the Dow and Nasdaq are on their ways to big losses. Visions of early retirement fade quickly. If I had a Fidelity account, I might actually be able to trade shares.

2:40 The mammoth FAO Schwarz store

to *Annie Get Your Gun* at the Marquis Theatre. After I choose the type of seat I want, a message pops onto my screen: "The requested content contained an unsupported content type. Note the error and contact the developer of this query." I picture a lonely developer sitting in a windowless office in a Manhattan startup. I imagine storming up to his desk. "I want to see *Annie Get Your Gun*. Why aren't you supporting my content type?" I demand. The developer bursts into tears.

I am getting tired and cranky. Time to



Where to go: Locating public facilities worked (see below), but finding a wireless signal high above Wall Street didn't. After lunch, comparison shopping.

Caroline looks unfazed, but I sense she thinks I'm acting like a jerk. I explain that being a jerk is part of my assignment.

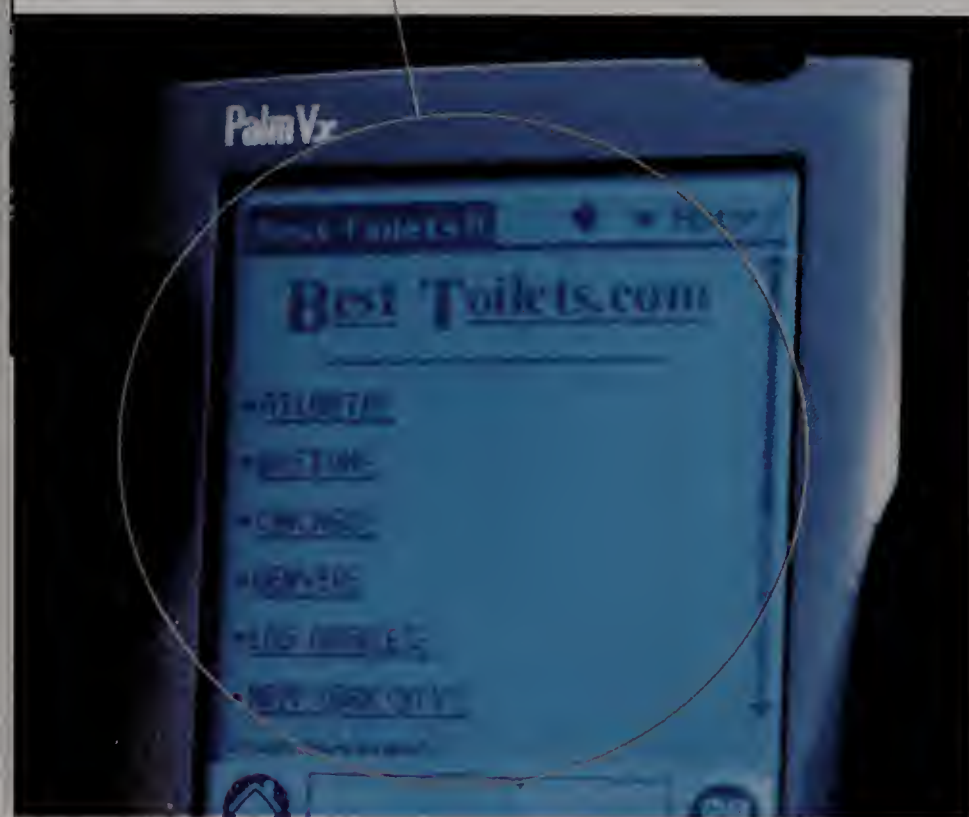
1:45 Caroline declines dessert and returns to her office, leaving me to wander lower Manhattan. Surrounded by floor traders who hover in clusters outside the New York Stock Exchange taking cigarette breaks, I

at 5th Avenue and 58th Street is pulsating with crowds of holiday shoppers carrying large bags. I push my way through the mobs in search of a present for my son. In the far corner of the lower level, *The Emperor's New Groove*, a Sony Playstation game, is listed for \$44.95. I pull out my Palm and once again log on to MySimon.com, curious to see if I can get a better deal. Aha! MySimon.com lists the same game for \$34.99 at KBKids.com. Of course, that's not including shipping charges. I head upstairs and pick out a toy station wagon. I have finally succeeded in acquiring a gift. My wireless devices, however, had nothing to do with it.

3:30 My cab is flying along the East River Drive at about 80 miles an hour. I tighten my seat belt and pull out my Palm. I click on Citysearch.com and proceed to the entertainment section, hoping to buy a ticket

make a coffee stop. The Starbucks locator app comes through again.

4:15 Recaffeinated, I enter the Wall Street offices of Mobilocity.net, an IT consultancy that specializes in mobile and wireless technology. Engineers in the company's "mobility lab" are testing gadgets and technologies such as wireless application protocol (WAP), i-Mode wireless Internet service from Japan's NTT DoCoMo and Voice XML, many of which are not quite ready for mass use in the United States. Goran Arbanas, the lab's chief, demonstrates a PocketPC with a streaming video clip from a new sci-fi movie called *Red Planet*. Arbanas and his colleagues acknowledge that finding the wireless applications that will lead to easy use and mass adoption is so far elusive. "It's a question of finding the compelling applications versus those that are just for show," says Justin Weiss, who was the company's business development manager at the time. Weiss adds that easy transactions such as retail purchases will come later. Mobilocity.net isn't alone. Engineers at sev-





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eral other nearby "labs," including Ericsson's research and development CyberLab NY, are in a race to find the most compelling services. Watching *Red Planet* will not be one of them.

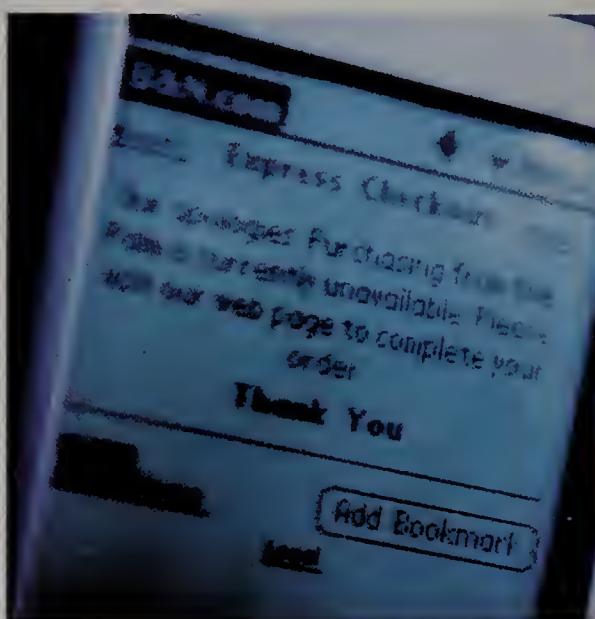
5:50 A crowd of about 300 nattily dressed entrepreneurs and business executives sit like well-behaved schoolchildren before a panel of wireless experts at a midtown gathering titled "The Wireless Revolution: Science Fiction, Reality, or a Little of Both?"

"How many of you use the wireless Web for anything more than e-mail?" a panel member asks. Fewer than half raise their hand. Still, they are clearly eager to learn about the future of the wireless Web from such luminaries as Raj K. Gupta, president and founder of YadaYada, a wireless Web portal; Bob Greene, managing partner at Flatiron Partners, a venture capital firm that specializes in the Internet; and Jason Devitt, CEO and cofounder of Vindigo, a city guide for PDAs. "M-commerce is not e-commerce," Devitt says, noting that many people aren't likely to actually buy things on their devices. You can't replicate the PC for ease of use and security. The key to mobile commerce, he says, is helping the consumer find the nearest store. Couldn't have said it better myself.

Shopping, with Strings Attached

With so many standards, wireless applications are prone to problems

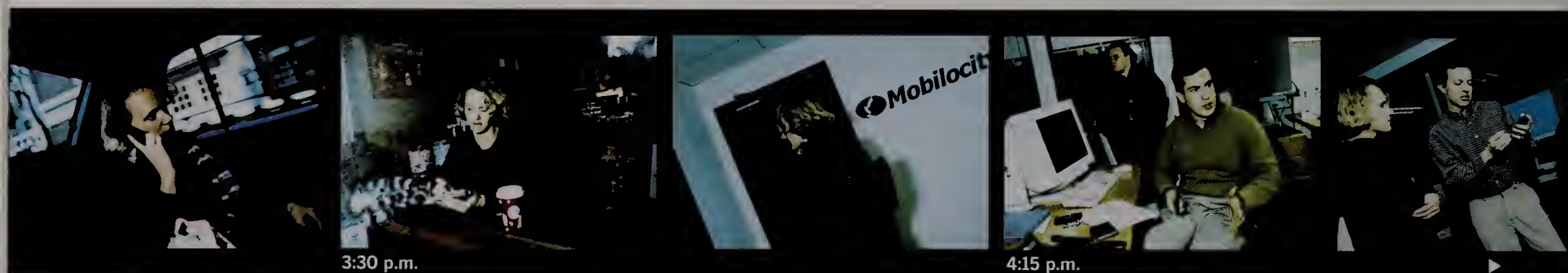
The problems I faced trying to log on to Barnesandnoble.com, (see below) CitySearch.com and some other sites are most likely because of code problems, says Robert Albert, vice president of wireless and business development for Barnesandnoble.com. The current difficulties, Albert says, stem from the wide array of Web languages and standards involved in mobile commerce (see "How to Speak Wireless,"



Page 122). Developers working with Barnesandnoble.com, for example, are creating applications for multiple platforms, including the Palm operating system, Windows CE and Research In Motion's operating system, that will work on an array of standards. "Our service on OmniSky usually works really well, but there are a number of potential things that can happen," Albert says. In addition to code glitches, users can encounter network problems or spotty coverage, especially in tunnels. For all of these reasons, Barnesandnoble.com is now working with

Boston-based NetMorf in order to "reduce the possibility of the site being down."

Barnesandnoble.com chose to outsource its wireless applications with NetMorf in order to work with specialists in the complex and quickly changing field. The bookselling giant isn't releasing any figures about the level of its investment in wireless or the results of its efforts, saying only that they are "exceeding their expectations." Albert estimates that there are 1 million people in the United States who use the wireless Internet, only 1 percent of the roughly 100 million mobile phone subscribers. Still, Barnesandnoble.com is forging ahead with its wireless initiative. Says Albert: "We don't underestimate the value of extending our brand to the pockets and purses of consumers across the country." —S. Patton



3:30 p.m.

4:15 p.m.

On the go: Calling home from a cab; refueling at another Starbucks before heading to Mobilicity.net's gadgets lab, one of the city's many wireless ventures.

8:00 As the wireless discussion breaks up, I ponder what to do next. I never did get a ticket to *Annie Get Your Gun*, and it's a little late to just drop by. I consider seeing a movie and tap on Moviefone on my Palm. *Quills* is playing at 8:45 across town at the Lincoln Plaza Cinemas. I might have time if I rush, but I want to make sure tickets are available.

I try to buy a ticket online at Moviefone.com but am foiled once again: "Due to technical difficulties, we are unable to process your request at this time." I call my editor to complain. He suggests that my blood sugar is probably low (I haven't eaten dinner), and I should order a pizza on the Palm. I don't think it's possible. Instead, I flag down a cab

and start checking my Palm version of Zagat's for restaurants near my hotel. A restaurant called Felix is just down the street. Despite complaints of "actress-model waitresses" in the review, I decide to try it out.

9:45 Zagat's was right. Our waiter at Felix was more interested in chatting with friends at the bar than in taking our order. A

know your customer

Industry analysts estimate that most companies earn more than 80% of their revenue from returning customers. Imagine knowing exactly what these valuable customers need or want before they do. And being able to offer the right services or products before they ask. To grow your business profitably in today's economy, you have to exceed customer expectations. That's where customer relationship management (CRM) comes in. **See for yourself how a CRM solution, like Infinium CRM, can revolutionize the way your organization attracts and retains your most profitable customers. For a free online product demonstration, visit www.infinium.com/seecrm.**



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VIEW FROM THE STREET

service rating of 15 out of 30 was generous.

11:00 Collapse in a heap. Dream about wireless devices.

Next day 7:45 a.m. Wake up feeling guilty that I have failed to get anything for my husband, who has been holding down the fort. I try OmniSky but again fail to get a connection. Pull out my phone, tap on Amazon.com and look for Radiohead, *Kid A*, a new CD recommended by Caroline, my New York friend with whom I had had lunch yesterday. Gaining some dexterity on the tiny screen, I tap in my e-mail address and choose one-click shopping. Amazon tells me: "Entering an unsecure area." I forge ahead, press buy and wham, I have made my first wireless purchase. I feel unsure that the CD will ever arrive at my home, and I have visions of hackers capturing my credit card number and assuming my wireless identity. Still, I am strangely exhilarated. Would I do it again? Probably not. (Wrong. Two days later, I bought a book on Barnesandnoble.com's Sprint PCS site.)

8:10 The Soho Grand Hotel doesn't have wireless checkout; I head to the counter. As I wait for my receipt, I check the weather forecast back home on the Weather.com site on my Palm: Expected high 38 degrees Fahrenheit. I check the news headlines: We

Wireless Arsenal

Here's a rundown of the gadgets and applications we took to New York City



A. PalmVx with OmniSky modem: My company's CIO, David Woodall, suggested I get this, mainly because it's possible to configure the device to receive our company's Lotus Notes e-mail. **Cost:** \$399 for the Palm, \$299 for the OmniSky modem, plus \$39.95 a month for the OmniSky service.

The OmniSky device transmits data at around 19.2Kbps, about a quarter of the speed of standard dial-up modems on PCs. OmniSky says the speed should increase to 128Kbps in the next year. The OmniSky service is deployed in 161 metropolitan areas (a notable exception is Atlanta). It runs on a technology called cellular digital packet data (CDPD).

B. Palm collapsible keyboard for the Palm V. **Cost:** \$99.00

C. Sprint PCS Touchpoint phone with dual band: Smaller and more compact than the model with the larger screen. Uses handheld devices markup language (HDML) to show webpage text onscreen. **Cost:** \$83.99 (used from Sprint store); \$10 per month for Internet service (free for the first six months).

Applications I downloaded onto the Palm: MySimon.com—comparison shopping service that provides lowest prices for electronics, AvantGo—news and information service, Starbucks Store Locator, Where2Go Public Restrooms Locator—best public restrooms in top cities, Zagat's restaurant guide, Merriam-Webster dictionary.

Sites Available on OmniSky: Ameritrade, Barnesandnoble.com, Buy.com, E-Trade, MapBlast, Mercata and Travelocity.com.

Popular sites not available on OmniSky: Amazon.com, Kozmo.

—S. Patton



Midtown event: Entrepreneurs gather to hear wireless experts; Patton seeks tickets to a Broadway show before dinner; end to a busy day.

don't have a president yet. I have a ticket on Amtrak's new fast train, but unlike the major airlines, Amtrak doesn't have a wireless site to check schedules.

8:30 As the train leaves Penn Station, cell phones start ringing around me. A woman sitting across from me opens a laptop computer and says to her colleague: "I wish we

could get e-mail when we're on the road."

Though frustrating, my wireless day in Manhattan gave me a clear view of the promise and problems of wireless communication. I enjoyed the comparison shopping, but technical problems kept me from effortlessly buying gifts on the run or snagging tickets to a Broadway show. I liked being in

touch with the office, but did I really need to hear from my editor so often? Like many who have ventured to the Big Apple before me, I came with high hopes and I'm leaving jaded by the experience. **CIO**

Susannah Patton (spatton@cio.com) likes her PDA (and Radiohead) as a result of reporting this story.

A large, conical pile of crumpled white paper dominates the center of the frame. At the very top, a single light bulb hangs from a cord, casting a soft glow. The background is a dark, textured blue. The text is overlaid in a light, elegant script.

*You think
your company's
online.*

But it's not.



The bridge between the paper world and

Your investment in IT infrastructure is huge. And the impact of the Internet on your IT budget grows larger every day. You've poured tons of resources into ERP systems as well as e-mail and document workflow systems. How much? Well, studies show that as much as 50% of an average IT budget can be involved with managing documents.

True, there are more documents online than ever before. But it's also true that we are creating more paper documents than ever before: twice as many as just five years ago. The reason is simple: Most companies have lots of off-ramps that turn electronic documents into paper documents, but almost no one has lots of on-ramps capable of converting paper documents into electronic ones.

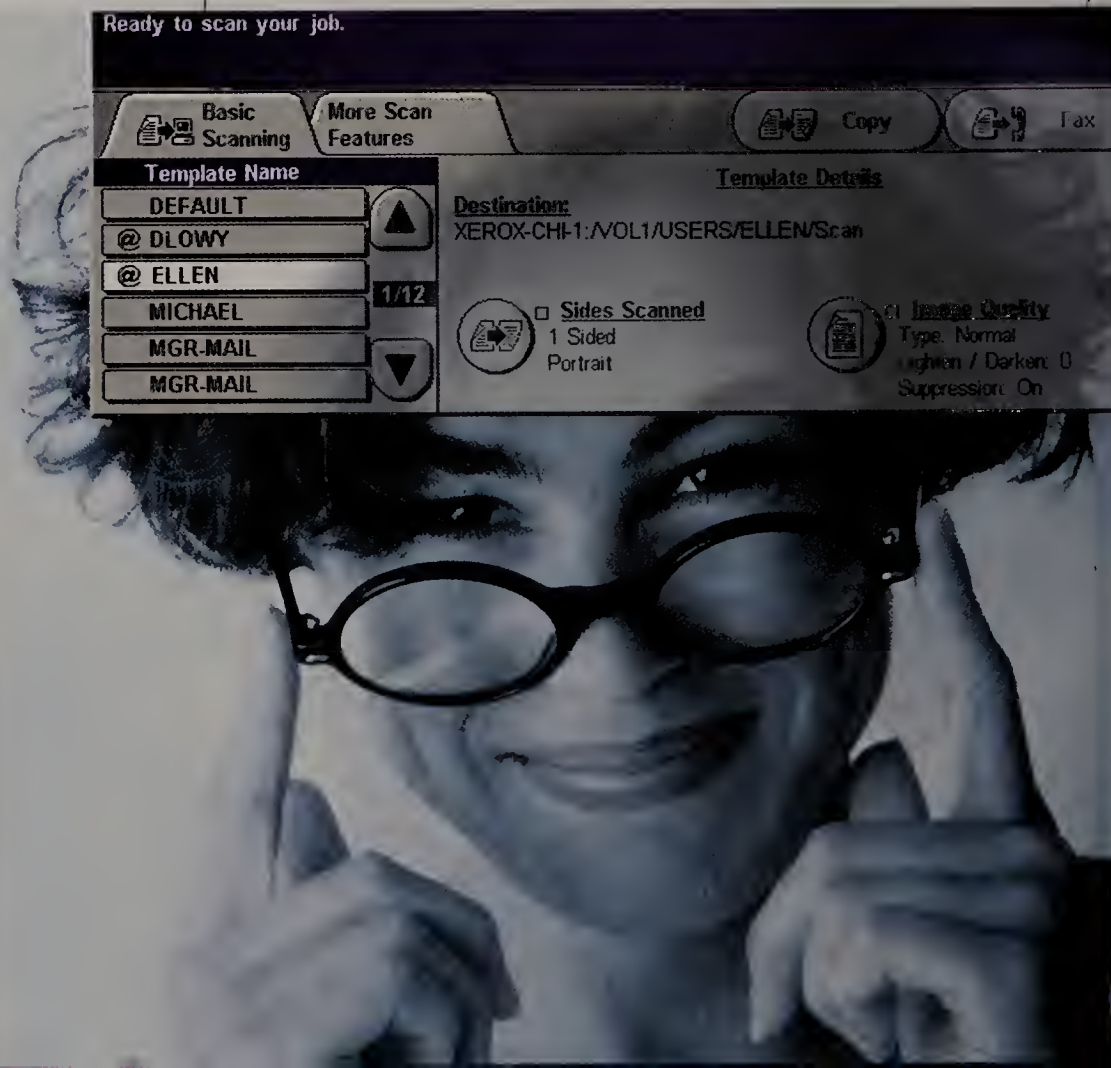
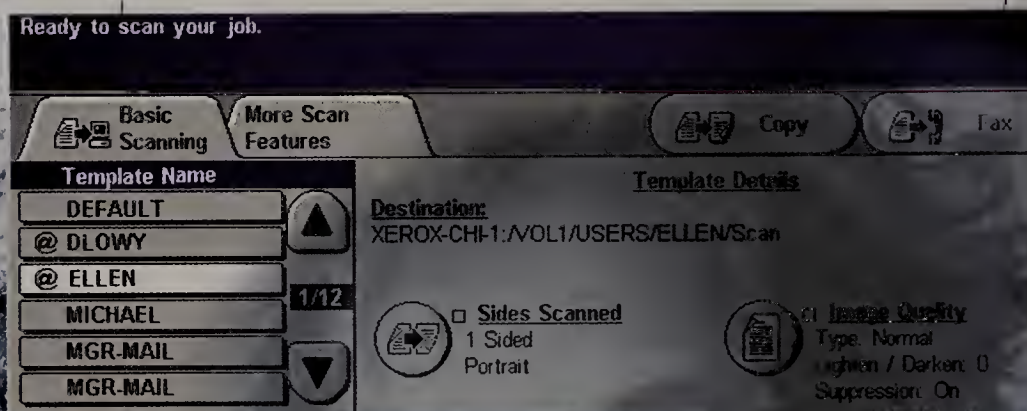
In fact, giving you new ways to leverage your IT investment by bridging the frustrating gap between the paper world and the electronic world is exactly what the Xerox Document Centre system was designed to do.

It's about document imaging for every workgroup.

If scanning is on your radar at all, you probably see it as limited to environments with dedicated operators. And so it has been. But the Document Centre system is changing that in big ways.

For starters, a Document Centre lets people work the way they are used to working—you can scan documents in the same place you print or copy them—it's that easy and that accessible. Of course, the Document Centre gives workgroups of 10 or more desktop control over everyday functions like printing, copying, PC faxing and finishing. What's more, by making document imaging an "everyday" function, the knowledge and information recorded in paper documents can now become a seamless part of the digital workflow.

XEROX DOCUMENT CENTRE



the online world is now open for business.

Scan directly to the Web or virtually anywhere else you want to.

Going out to the hallway and scanning large documents into the digital stream at up to 65 ppm is certainly efficient, but the important question remains: Where is all that information going, and what can you do with it once it gets there?

☐ Document Centre lets you scan directly to industry-standard messaging and collaboration platforms

like Microsoft Exchange, Lotus Notes or Domino.Doc.

☐ You can scan directly to a Web repository, so anyone has instant access to information from a remote location.

☐ Scan to your PC desktop, and with ScanSoft PaperPort and TextBridge software bundled with Document Centre, you can drag and drop your scanned image into any one of 150 industry-standard applications. You won't need to re-key your documents.

Scan 65 ppm

3 easy steps

- 1 Select scan folder
- 2 Select destination
- 3 Press green button

OPEN ARCHITECTURE SYSTEMS

Microsoft
Windows NT 4.0 & 2000
Appletalk
Novell NetWare 4.X
PCL 6
Token Ring 14/16MB
TCP/IP
OS/2 WarpServer
Ethernet 10/100
Adobe PostScript 3

☐ Or scan documents to the network, and using software like Xerox DocuShare, users can access them through any current Web browser on any platform. It gives you an electronic file cabinet that's a very efficient way to share knowledge and dramatically reduces e-mail traffic.

☐ Or combine Document Centre with Xerox FlowPort. FlowPort is a Web-based software platform that manages the flow of documents from paper to digital and back again in dramatically new

ways. For example, FlowPort gives mobile workers the freedom to access and print any documents on the Web without using a PC.

☐ And when it comes to getting your digital documents back into paper form, Document Centre's open architecture supports all major industry printing standards and encourages third-party software solutions to thrive. So you can print not only from your desktop or from the Web, but also directly from your mainframe, including ERP applications like SAP.

☐ In short, things once limited to paper are electronically archived, accessed, shared and easily printed wherever you need them. It doesn't just increase productivity, it decreases costs and saves time. Turn the page to learn how one of our customers is already benefiting.

The Web

Microsoft Exchange
Public Folders

Lotus Notes

Xerox DocuShare

Lotus
Domino.Doc

PC Desktop

Paper or digital, it's about solutions that leverage the network.

We have hundreds of customers who report impressive results. But here's one in-depth story of how a Document Centre solution reduced one organization's work-cycle time from three days to just three minutes.

The Customer:

Center for Technology Management, in a prominent Midwestern research institute.

The Problem:

There are dozens of huge file cabinets overflowing with documents—patents, notes and contracts about inventions the university owns. Each year up to 1,500 new folders are added. Every day, dozens of people call and request files. By law, the university must provide public access to any of these thousands of complex scientific documents for reference, revision, notation or collaboration. And it must be done for 25 years. The commitment of time, space and personnel is large and growing.

The Solution:

Combine Xerox FlowPort and DocuShare with two Document Centres. This gives you a search engine for all your documents.

Now when people need a document, they just check off the file they need on a FlowPort cover sheet, scan it into the Document Centre, and FlowPort software finds and sends the requested electronic file to a server that can print, e-mail or store the document. What's more, once the file is stored, DocuShare lets you manage it on the Web, giving authorized users instant access for viewing, downloading and printing documents from anywhere at any time.

The Result:

A process that used to take three days can

now be completed instantaneously. Documents are accessed and shared electronically. Paper is eliminated while collaborative work processes are made simpler. Security is improved. Those 20 file cabinets are soon history. Costs are lowered. Time is saved.



Online or off, it's about a simpler way to share knowledge.

In a world of intranets and extranets, of e-commerce and the Internet, you need state-of-the-art technology and expertise to manage and share the documents that contain the knowledge in your organization. The Xerox Document Centre is a digital platform engineered from the ground up to eliminate the barriers between your paper and online documents.

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Wireless technology lets users roam—but also opens the door to problems. Here's how to think about balancing the rewards with the risks.

BY BEN WORTHEN

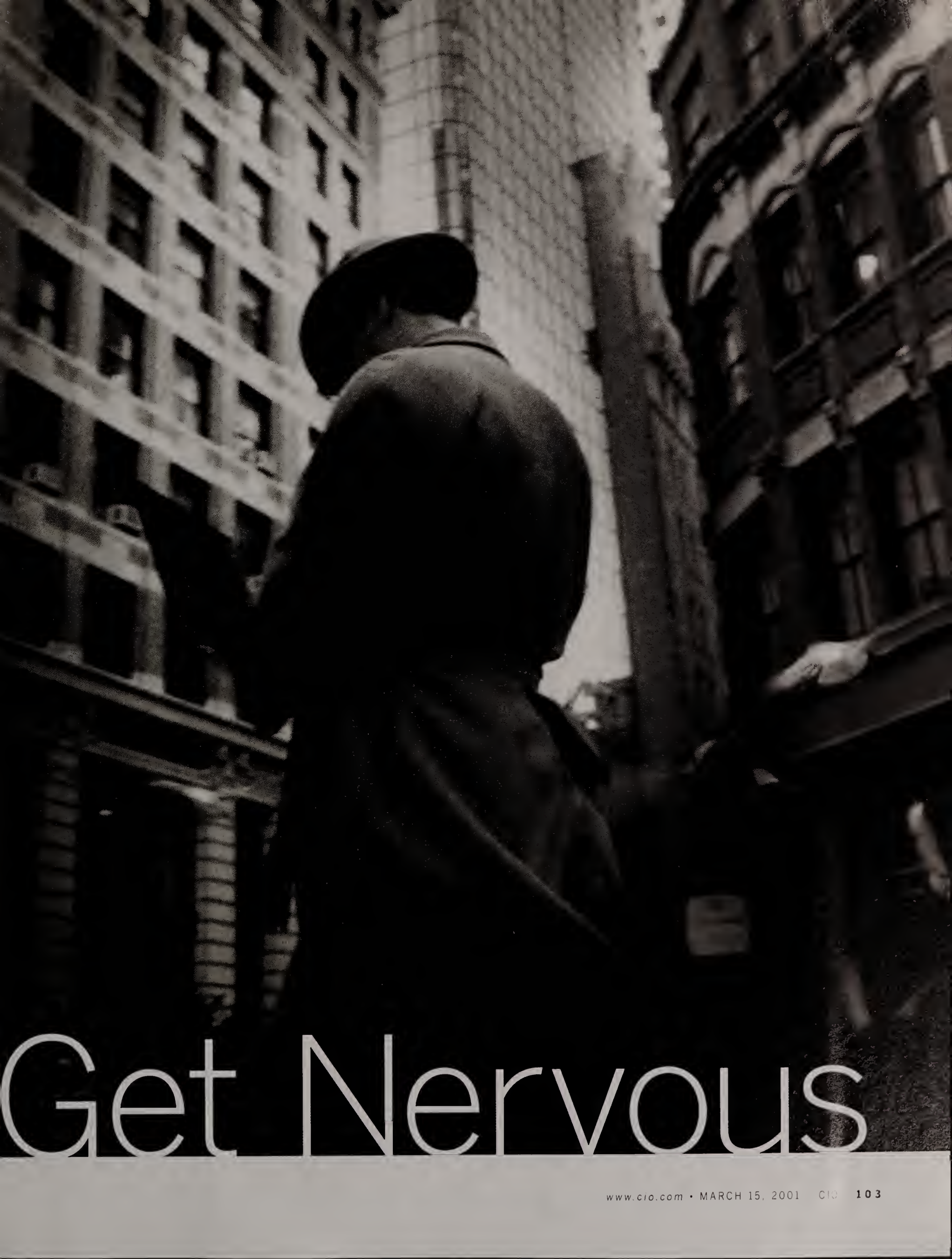
Reader ROI

- ▶ Get tips for safeguarding devices and wireless systems
- ▶ Understand how to assess risks involved with wireless technology
- ▶ Learn what questions to ask about your wireless applications

I'M NOT A HACKER. I don't know the first thing about breaking into corporate information systems. Yet one night recently, I went looking for a wireless network signal. As I walked through downtown Boston's financial district with my laptop open in my arms, the green light on my 802.11 wireless LAN adapter card stopped blinking, and the network scanner latched on to someone else's wireless local area network. It was easy—the hardest part of the operation was turning on my computer. For the sake of the company that uses the network I detected standing outside 50 Federal Street (and *CIO*'s legal counsel), I ended my experiment there. But if I can inadvertently stumble onto a network simply by purchasing a \$150 wireless network card designed for any user, just think what an experienced hacker could do.

This isn't a sensationalized scare story. But the fact is that wireless technology is an important business channel (see "Decidedly Not Gee Whiz," Page 130). IT executives need to develop a commonsense approach that assesses both the risks and the rewards of the technology, regardless of whether the wireless implementation adds capabilities to an office building LAN or provides mobile device users with Internet access. The latter group will surpass 500 million worldwide by 2002, up from about 100 million now, according to IDC (a sister company to *CIO*'s publisher, CXO Media).

Time to



Get Nervous

Iain Gillott, the president of iGillottResearch in Austin, Texas, and a former wireless analyst at IDC, says that wireless has been on CIOs' hit lists for years. "The problem is that something always [came] in like 'build website' or 'get e-commerce,'" Gillott says. In the five years Gillott says it has taken wireless to rise to the top of the list, the technology has matured to the point where you can extend Web-enabled applications to wireless

devices without creating a lot of unique technical challenges. Ironically, the advanced state of the technology relative to the slow rate of adoption gives the mistaken impression that all security and systems support problems have been solved. They haven't.

Wireless frees users to roam and still access important information. But there's an obstacle course awaiting IT executives looking to implement wireless projects. The freedom that comes with allowing roaming users

to access information adds security risks—both at company headquarters and with the end users' portable devices. Wireless service coverage and quality varies by location. And different companies providing wireless service in the United States base their services on an array of standards that are not all compatible with each other. "Frankly, we're still sorting it out," says Pat Flynn, CIO of Bellevue, Wash.-based trucking company Paccar. "There's even the possibility that here in the U.S. we may have to support multiple standards to get the coverage we need."

To make sense of all this, you need to study both the benefits and risks of any wireless project to see if the pluses win out. And both CIOs and security experts suggest starting out slowly with small-scale pilot projects. Researching your specific situation, your business needs for wireless technology and even your users' habits in the field will help your company set policies for systems and end users' mobile devices, and mitigate many of the risks (see "Watching Your Back," Page 110).

Think Risk

Deciding whether to go wireless is the first step. And it's important to make the decision by measuring the benefits against the risks. The cost and likelihood of a proprietary process or a customer list falling into the wrong hands (or the wrong handheld) need to be reevaluated for the new environment. "Any time you extend beyond the walls of your company in a network sense you're opening yourself up to some security risks," says Steve Matheys, CIO of Schneider Logistics, a domestic transportation company based in Green Bay, Wis.

Craig Friedrich, vice president and CIO of InFocus, a Wilsonville, Ore., projector manufacturer, puts it another way: "The hard part for the CIO is trying to figure out if the benefit that the employees or the customers are going to get outweighs the risk you think you are running. And the fear is you don't know what you don't know."

CIOs and other IT experts say you

"The hard part for the CIO is trying to figure out if the benefit that the employees or the customers are going to get outweighs the risk."

—Craig Friedrich, CIO, InFocus



PHOTO BY ROBBIE MCCLARAN

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	SCANS 5000+ EMAILS PER HOUR
	SCALABLE TO 2000 USERS
	CONTENT FILTERING
	AUTOMATIC UPDATES

McAFEE

should be able to answer the following three questions.

Is the device right for the intended use? "The old adage really applies here," says Ross Patterson, the CIO of Greenville, S.C.-based electronics manufacturer Kemet Electronics. "Just because your new tool is a hammer doesn't mean that every problem is a nail." One drawback of mobile devices is their size: A Palm III has a 5.6-square inch screen, for example, that

Roads Hackers Travel

A good defense means knowing how to protect points vulnerable to attack

Protecting the security of systems using wireless technology means focusing on three points of communication: the wireless device, the company network and the gateway between the two.

To start with, a wireless device user could leave the device anywhere. The best policy is simply not to store important information on a wireless device. (Denver International Airport estimates it collected 20 to 30 such devices in its lost-and-found bin over the Christmas 2000 weekend.) If this is impractical, require the use of passwords. Ross Patterson, CIO of Greenville, S.C.-based electronics manufacturer Kemet, says he can't access information on his Palm until he enters a particular series of key-

strokes. Encryption software is another possibility. Using ultraviolet ID stamps or hidden transmitters on the devices could help recover lost valuables.

Next, a third-party broker provides a service called a gateway, which passes a signal between a wireless device and the intended recipient (like a company's network) via the Internet. And the information cannot be protected during that entire transmission. For example, when an encrypted wireless application protocol (WAP) transmission meets the gateway, it is temporarily decrypted, then re-encrypted using the secure sockets layer (SSL) standard and resent as an HTML transmission. The security lapse occurs during that temporary decryption on the gateway. Even though the new version of WAP, due in 2001, will include encryption technology that covers this gap, a user company like CSX Technology still has concerns. "We need to make sure that we audit [cellular service providers'] systems before our

Wireless security means anticipating the havoc a malicious intruder could wreak.

makes access to much more than short text messages impractical. For this reason, Patterson, who does access Lotus Notes e-mail from his Palm handheld, decided against using the device for transactional or data-intensive applications.

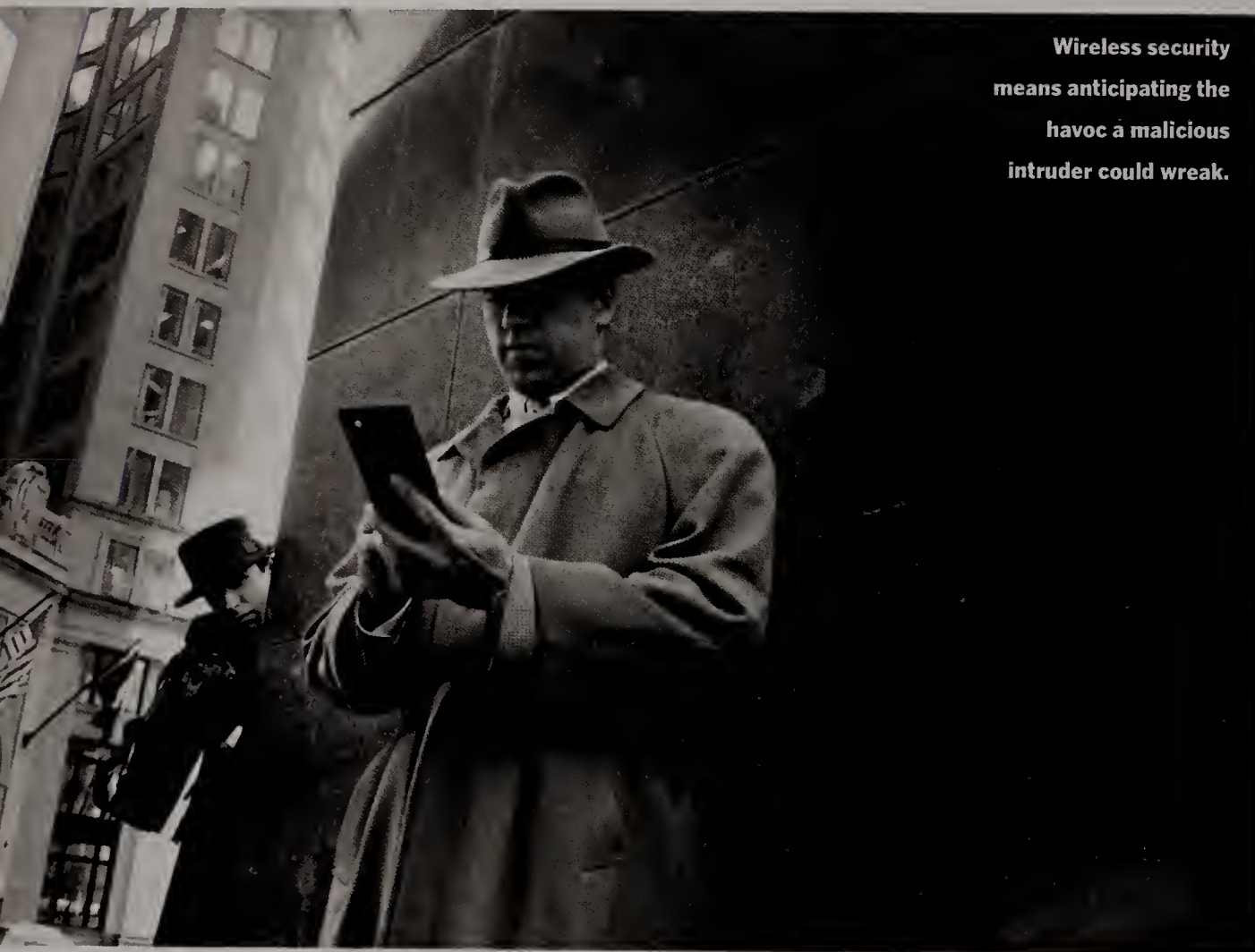
Will people use it? InFocus's Friedrich says that the degree to which a wireless application is adopted by its intended end users (customers, employees, business partners) is a major factor in determining whether it should be offered. "If I assumed it was going to get 150 users, and I got 15, then forget the cost

business executives start e-mailing their business-sensitive information through that network," says Henry McCreary, enterprise architect for CSX Technology.

Security expert Mudge, research and development vice president for Cambridge, Mass.-based @Stake, says this level of concern is vital. What, asks Mudge, is to prevent a malicious interloper from building a miniature gateway in a briefcase and simply following someone. And this would allow the interloper to capture and store passwords and any other information the unsuspecting user chose to send.

The third potential trouble spot is the transmission between the gateway and the company. What if the malicious interloper from the above example replaces the company at the receiving end of the communication? Craig Friedrich, CIO of InFocus, a Wilsonville, Ore., projector maker, says the best way to avoid this dilemma is to know your service providers—intimately. It's a good sign, he says, "if the [service provider] says 'Sure, we'd love to tell you what we're doing and how we're doing it.'" Study their infrastructure. Learn their policies.

—B. Worthen



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*Mark Tonnesen, Vice President Information Technology
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for a minute, but are those 15 people worth the risk that I am running here?" A CIO shouldn't be afraid to pull the plug on a project that isn't benefiting enough people and should constantly reevaluate how many people are using it and who they are, Friedrich says.

Is there a business case? Despite the need to gain wireless skills, it's foolhardy to undertake a wireless project that won't benefit the company. That's why Chuck Wodehouse, president of Jacksonville, Fla.-based CSX Technology, the business unit of the Richmond, Va.-based rail shipping company CSX, always asks himself if he is "going to be able to get the value out of this that justifies the expense." Experimentation is good, but it should be practical experimentation.

To Wireless or Not?

Here are two cases that present both sides of the risk/cost versus benefit assessment. CSX Technology recently rolled out its first wireless application. According to Wodehouse, the application was a simple extension of the company's tracking software to any Web-enabled device, with information made available to both employees and customers. The move was more a customer relations effort than the introduction of a new revenue channel. It wouldn't make the company any money, but then again it didn't cost much—since the application was already Web-enabled, it took only a few thousand dollars to extend it to wireless devices. "Users find it pretty horrific if they are on the road or at home and a problem occurs, and they can't get online to use our normal track-and-trace application," says Wodehouse. This way, a stuck-in-traffic customer watching a storm approach could use a cell phone to check the estimated time of arrival of an expected pig iron shipment and begin looking for another source for the material.

Because the information is already available over the public Internet, no special security measures were taken in developing this application. And with information like train arrival times and order shipment



PDAs could improve care, but Cambridge Health Alliance will limit their use until secure systems are available, says Tom Coffey, network engineering director.

status, the security investment didn't seem warranted. The experience, which gave Wodehouse's staff some wireless skills from a "toe-in-the-water project," convinced CSX Technology to invest in more intensive wireless projects for future deployment, like e-mail access and applications designed to help sales-force field representatives plan and coordinate their work.

At Cambridge Health Alliance in Cambridge, Mass., a consideration of risks and costs versus benefits led to a different outcome. "The ability for physicians to have their own device is compelling," says Tom Coffey, director of network engineering for the public health-care system that includes two urban hospitals. "And could they provide better care? They probably could." But, Coffey says, portable devices that routinely leave the office

represent significant security challenges.

Patient data, he says, is inherently at risk. Among the many parties financially motivated to obtain patient data are insurance companies, which could use the data to make liability assessments, and marketing companies, which could tailor promotions to patients based on their medical conditions. And there are other privacy concerns. Coffey recalls attending a training class a few years ago with programmers from the Hospital Santa Monica in Southern California and hearing their stories of supermarket tabloids offering thousands of dollars for medical information on celebrity patients.

Safeguarding patient data stored on PDAs is risky, Coffey says. Until secure and affordable systems and devices are available, Cambridge Health Alliance limits its staff's





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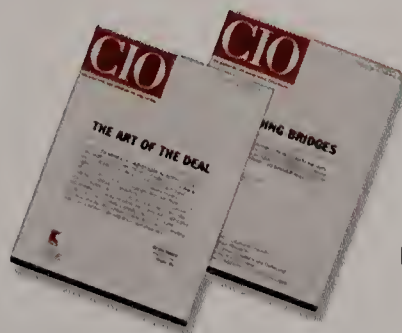
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PDA synchronizations to nonpatient administrative data like basic calendar information.

The Malicious Interloper

CIOs agree that once a wireless project gets the green light, security becomes the most obvious challenge—and potentially the most devastating.

Since conditions are always changing, no system will ever be 100 percent secure, says Mudge, a security expert who has testified before Congress using his single-word nom de guerre. Mudge says security checks are like going to the doctor: You might get a clean bill of health at the end of your visit but then get hit by a bus when you walk out the door. Suddenly you're no longer healthy. But, by understanding the security risks inherent in every technology and making decisions that take these risks into account, you can greatly reduce your exposure. Mudge, research and development vice president for Cambridge, Mass.-based Internet

security consultancy @Stake, suggests imagining a malicious interloper whose sole desire is to attack your company through your latest technology. By discovering the weaknesses yourself, you can better protect against such an attack (see "Roads Hackers Travel," Page 106).

InFocus's Friedrich agrees. "The hacker types just love to talk about what they are up to and how they are doing it," he says. "So we went surfing on hacker sites to find out what are these guys up to. If there is someone bragging about how they are going to break into your house you might as well listen to them."

Friedrich didn't just go online to listen to hackers. He also wandered around his company's Seattle office building attempting to pick up random wireless signals that the company's network was giving out. With a wireless LAN, transmitters can be placed in any location and cast a signal at varying strengths. Wireless signals also travel through walls. "It is a brick building and the signal didn't seem

to poke through well," Friedrich says of his stroll around the building. "And where it does you have to be just about next to the building and holding your device up. It wasn't scientific by any means, but when you think about how someone would intrude, that would be the way." Friedrich concluded that randomly transmitted signals from the company's network were not a security threat because InFocus is set on a campus surrounded by lakes and fields. A device-wielding hacker would look pretty foolish.

Friedrich's is a practical approach. Yet, says Mudge, most companies are content with the first ad hoc installation that they find works. A note of caution: Due diligence requires more than relying on a vendor's instruction manual designed to get you up and running. Contenting oneself with the first settings that work and not playing the role of the prospective interloper invites risk. As Mudge says, a bewildered smile spreading across his face, "That's game over."

Standards

While Europe has nearly universal acceptance of the global system for mobile (GSM) cellular communication technology, the battle in the United States remains wide open. At this point there are four competitors: GSM, code division multiple access (CDMA), time division multiple access (TDMA) and Integrated Digital Enhanced Network (iDEN). (See "How to Speak Wireless," Page 122.)

Making matters frustrating is that major wireless providers have adopted different standards that are not compatible with each other. Verizon and Sprint PCS use CDMA, while AT&T and BellSouth use TDMA. VoiceStream Wireless uses GSM and Nextel uses iDEN.

While vendors have helped to make an application work with different wireless standards, it is still important for a CIO to know what standard a wireless service provider (such as one of those mentioned above) is using. "One question to ask is, Will their approach allow me to interact with multiple networks?" says Bruce Wootton, a Durham,

Watching Your Back

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- Do you have the skills and financial resources to support wireless applications?
- What device does your company use? Is it compatible with the intended use?
- How many people access corporate information through wireless devices? How does your company regulate this access?
- Is there a business case for the application that you are wireless enabling?
- What are the boundaries of your wireless LAN signal? Have you tested multiple configurations?
- Do you know your wireless provider's gateway and fraud policies? What transmission standard does it use?
- Where are you most vulnerable to an attack?
- Are your wireless applications carrier-neutral?

—B. Worthen



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N.C.-based analyst for the Hurwitz Group. "Most corporations, to fully leverage the benefits of mobility, will need to support a wide geographic reach that covers all the different locations. And given the current state of the wireless carrier environment [in the United States], you can't guarantee that you are going to get access everywhere."

With telecommunications heavyweights behind each standard, none is likely to go away anytime soon. Given this, and the real-

ity that some devices and some carriers work better than others in different locations, Wootton says CIOs should make sure that the functions in an application using wireless technology are device- and carrier-neutral.

That's a powerful idea, but sometimes you have to solve these issues one piece at a time. Greeley Gas, a natural energy company covering Kansas and Colorado, sought in 1997 to streamline its customer service operation as a pilot project for its parent company, Dallas-based Atmos Energy. The

company gave ruggedized mobile computers (known as Hammerheads, from WalkAbout Computers in Singer Island, Fla.), to field service technicians so that they could respond to and fill out the forms for a day's worth of requests without returning to the office. Gary Merritt, an IT manager at Greeley, says only nine of 94 trucks in the two-state area had good enough coverage to allow always-on cellular digital packet data (CDPD) connections. The rest of the trucks relied on circuit-switched cellular technology that often took up to 10 minutes to connect and download information. Merritt says it took him more than a year to find a systems developer—New York City-based Vaultus—to provide connectivity software to solve the problem.

Proceed with Care

The key to avoiding problems—security or otherwise—is understanding how the technology changes your business.

The key, most CIOs agree, is to take incremental steps, learning as much as possible during each pilot and limited rollout. Wireless technology itself doesn't leave holes that will lead to support or security hassles, but the way you implement the technology could. "My general advice is walk before you run," says Frank Gillett, a senior analyst with Cambridge, Mass.-based Forrester Research. "Don't do big projects unless you have the time and the resources to figure it out."

And the news isn't all scary, either. Remember my stroll around downtown Boston? I walked up and down a few streets, laptop poised, wireless modem activated, for about 20 minutes. You've read about the one strong, clear signal I picked up. But out of the host of office towers, housing banks, law firms and other corporate offices, that signal was the only one I found. Either there's little going on out there with wireless LANs or someone is doing something right. **CIO**

Staff Writer Ben Worthen (bworthen@cio.com) has no plans to stroll past your office with a wireless modem.

"Users find it pretty horrific if they are on the road and a problem occurs, and they can't get online to use our normal track-and-trace application."

—Chuck Wodehouse, president, CSX Technology

THE DEFENSE CAN NEVER RESTS



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Survival Tips

No standards. Few vendors. Skeptical users. Early adopters of wireless technology had it tough.

BY LAUREN GIBBONS PAUL

YOU WOULDN'T WANT TO HAVE BEEN a field sales representative for Frito-Lay back in the early 1980s. After delivering America's popular salty snacks all day in the sweltering heat or freezing cold, the reps had to return home to sort through a load of paperwork before they could crack open a cold one and put their feet up. Since the field sales guys technically owned the merchandise once they took it out of the warehouse, their day wasn't done until the books were settled by hand.

To hear then Frito-Lay CIO Charlie Feld tell it, most of the reps could hardly balance their own checkbooks, much less deal with corporate accounting tasks, so they often drafted their wives to help them. Sorting through the wads of receipts and forms was a nightly ritual that didn't exactly qualify as quality family time.

So Frito-Lay's 10,000 sales reps were happy to get their hands on first-generation handheld computers (HHCs) in 1986 that considerably lightened their homework. Based on a Fujitsu device with a homegrown application, the HHCs would transmit daily sales figures each

Reader ROI

- ▶ See how the first users of wireless technology blazed the trail for companies today
- ▶ Read about the challenges that faced the early adopters
- ▶ Discover how going out on a limb is sometimes the right thing to do

PHOTO BY JOHN CHIASSON

from the Pioneers



Winn Stephenson, a senior vice president of IT for FedEx, looked to wireless for answers to his company's phenomenal growth rates.

EARLY ADOPTERS

evening back to the corporate mainframe in Plano, Texas. With a careful pilot program, Frito-Lay's first foray into wireless technology was a success—salesmen bought into it and the entire program paid for itself.

Although the sales reps loved the new app, not much was easy about being one of the first companies to implement wireless technology. For one thing, there were hardly any vendors at the time. Pioneers like Frito-Lay had to fund multiyear research and development efforts and then cobble together their own solutions—at great expense, in both time and money. There were no standards for hardware, software or radio frequency data transmission. And—at least at first—there were no public networks that companies could use to transmit their wireless data. All this doesn't even take into account the doubters. Very few people believed that wireless devices would ever be as reliable as that sales rep and his wife hunched over the kitchen table.

In fact, the wireless pioneers made their investments in wireless technology not because they wanted to, but because they had to. They had no choice. In the case of wireless technology, necessity truly was the mother of invention.

Unplugging

By the early 1980s, companies such as FedEx, United Parcel Service of America (UPS) and Frito-Lay had experienced such wrenching growth that they could not continue without the aid of some cutting-edge technology. The paper-and-pen technology that had run these companies' field service

operations up to that time had reached the end of its natural life.

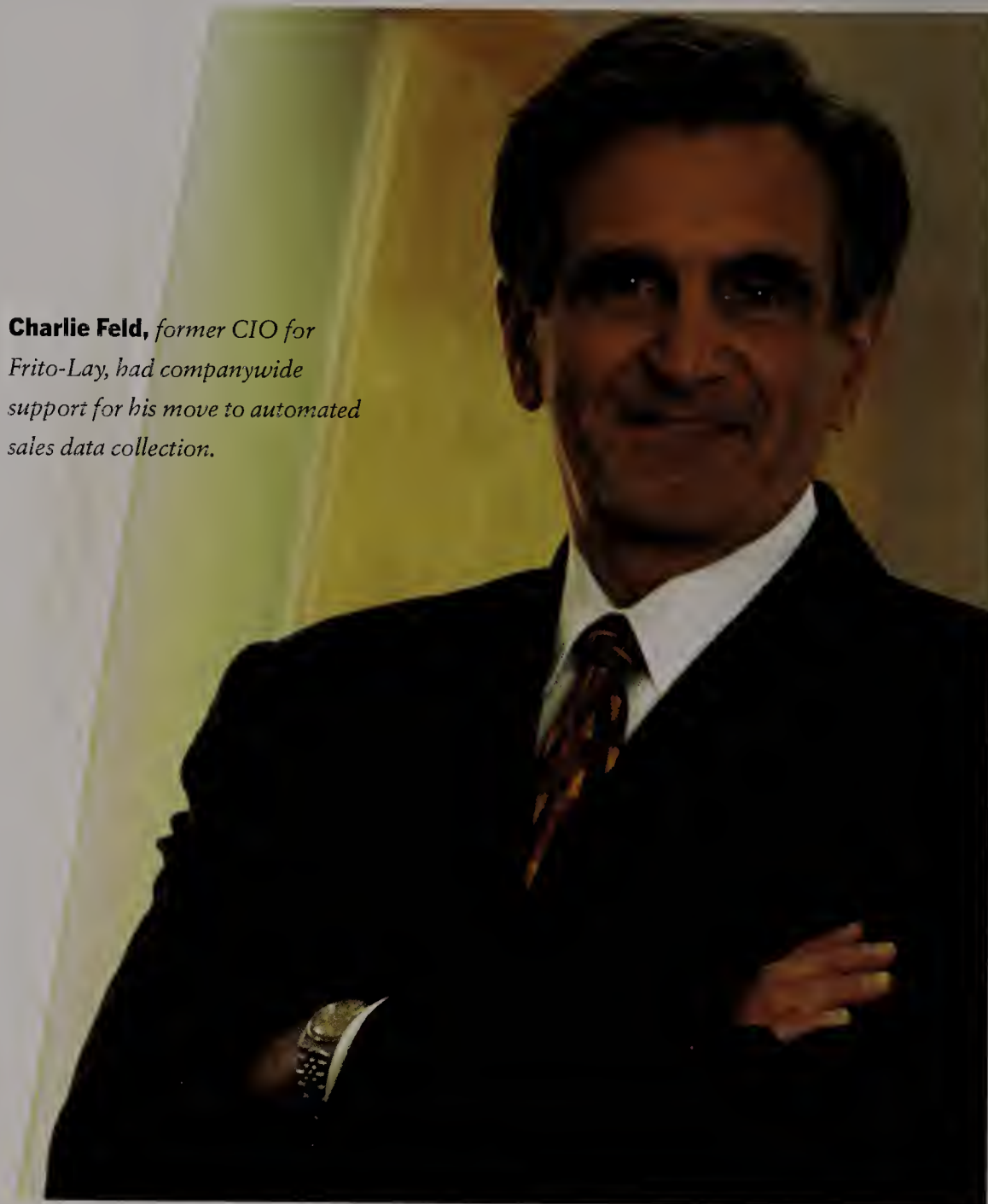
Exigent circumstances have a way of greasing the wheels when it comes to money for research. Or, as Doug Fields, vice president for UPS, puts it: "When them that's got the bucks has the ideas, it's a lot easier to get funding." Fields, a 12-year UPS veteran,

oversaw the early 1990s rollout of his company's self-developed handheld delivery information acquisition device (DIAD), which couriers used (and still do use) to track information about package deliveries. How times have changed.

For those going wireless today, basic principles gleaned from early experience still apply. As Feld can tell you, it's most important to pilot your wireless application on a tiny group, as he did with his selected early adopters at Frito-Lay. You must have a time frame to begin the formal rollout, of course, but be flexible. Wait for perfection before going to the next step, he advises. Deploying a flawed wireless application can do incalculable damage to user acceptance.

And don't forget that in the scheme of

Charlie Feld, *former CIO for Frito-Lay, had companywide support for his move to automated sales data collection.*



Pioneers like Frito-Lay had to fund multiyear research and development efforts and then cobble together their own solutions—at great expense, in both time and money.

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things, wireless is still new technology. As such, Winn Stephenson, a senior vice president of IT for FedEx, advises that you devote an in-house team to it. "Even with all the advances in public networks, wireless has enough subtleties and nuisances to be managed as a separate component. Any significant deployment requires quite a bit of work to understand coverage issues, performance, latency and other issues. You need someone in-house to sort through all this for you," says Stephenson.

"Who's This Package For?"

A decade after its 1971 founding, FedEx was growing by rates between 35 percent and 50 percent per year. That was good news for the company, of course, but bad news for the roughly 8,000 couriers and dispatchers delivering packages to homes and businesses nationwide. The dispatchers were using a Motorola two-way radio system—broadcast over proprietary FedEx voice channels—to contact the drivers (also called couriers) to let them know where to go next. But each channel could adequately support only about 100 drivers. The company was quickly running out of bandwidth. As the

number of drivers using the same channel went up, it became more difficult to access an open channel because of system overload, and drivers struggled to hear which message zinging over the system was meant for them.

Around this time, Stephenson and his

directly from the courier vans back to a central station.

Although Stephenson considered himself fortunate to have found Mobile Data International, the courier-management system was hardly turnkey. FedEx IT develop-

"We didn't have a model to say how to build this. We just had a huge problem that we were forced to solve."

—Winn Stephenson, senior VP of IT, FedEx

team began to search for a method to replace the voice-channel system. FedEx engaged Mobile Data International (now owned by Motorola), a small Vancouver-based company that provided a terminal that allowed couriers to receive dispatches via digital transmission. Initially, drivers would report package-delivery information to a central station every evening and upload the day's data into the mainframe back at corporate headquarters in Memphis, Tenn. By the second generation of this technology, the devices wirelessly transmitted the data

ment staff worked for months and even years to develop the SuperTracker, a handheld bar code scanner system, that was fully rolled out in 1986. "We didn't have a model to say how to build this. We just had a huge problem that we were forced to solve," he says.

FedEx senior management spent more than \$100 million on wireless technology hardware and development work during a period of about three to four years. Securing the funding—not exactly chump change in the 1980s—was a straightforward affair because management viewed the project as strategic. "[Wireless] was part of our go-to-market strategy. It fit our concept of what we wanted our products to look like," says Stephenson. "It reduced the number of additional dispatchers we had to hire each year. It made it possible to grow that fast."

FedEx's investment has paid for itself many times over. In fact, the courier-management system formed the basis for FedEx's famed application in which customers can determine the whereabouts of their packages by their tracking numbers on the phone (and now on the Internet).

The 1 Percent Solution

For another wireless pioneer, however, the funding process wasn't quite as painless. Frito-Lay began examining alternatives to manual collection of product sales information as far back as 1975, but the enabling

Oh, Pioneers *Lessons from the early days of wireless*

Don't be afraid of new technology. According to Doug Fields, vice president for UPS, using untested technology gives you a chance to be more creative than if the technology is more mature and the parameters of usage more accepted. Another bonus: The early vendors will be learning alongside you and therefore are usually more responsive and collaborative. If you're lucky, this can translate to—you guessed it—competitive advantage.

Dedicate a special wireless team. Wireless technology is still new enough even today that its use warrants a dedicated technology staff, according to Winn Stephenson, a senior vice president of IT for FedEx. You'll need an in-house team to sort through the variables of coverage issues, performance, latency, standards and the like.

Start very, very small. Charlie Feld, CIO at Frito-Lay during the late 1970s and 1980s, rolled out the handheld computer application to a tiny pilot group. Feld lavished this group with tender loving care—soliciting their feedback and solving problems immediately—making sure all was well before formally rolling out the application to the rest of the group.

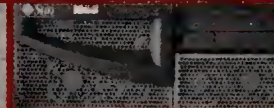
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EARLY ADOPTERS

technology for mobile computing did not yet exist. "Until the PC came out, the technology was just so cumbersome. You couldn't even fit the [first mobile devices] into a route truck back then," recalls Feld, then Frito-Lay account manager for IBM. With the advent of the PC in the early 1980s, however, the time was ripe. One of the first

recalls Feld, now CEO and president of the Feld Group, a Dallas consultancy. Although the benefits of moving to an automated sales data collection system were huge, the CEO of Frito-Lay parent PepsiCo told Feld it would have to be self-supporting. If Feld wanted to go ahead with the project, he would have to get each of the sales divisions to agree to reduce their selling expenses by

down—if not completely eliminate—the hassles of toting around clipboards and reams of paper every day.

Feld selected Fujitsu as his partner on the project and rolled out the HHCs to a hand-picked pilot group. This initial group was only about 50 people, or half of 1 percent of the total field force. That was no accident. Feld wanted to ensure the application was in perfect shape before he widened the roll-out. Since salespeople are famously resistant to change, Feld interviewed sales managers across the country until he came up with people who seemed to be open to new ideas and practices. Once the pilot was deployed, Feld and his team lavished the pilot group with extra care and attention, making sure problems were solved quickly and taking their suggestions for application improvements. "This small group felt pretty special because we had technicians working with them and responding to their problems on a daily basis. They developed a sense of pride that they were part of the invention process," says Feld.

Getting it right at the pilot stage was absolutely critical. "Once you get outside your small test group, people get discouraged if things don't work right," he says. "The application needs to be rock-solid from the start." With a happy group of pilot users to spread the word throughout the organization, it would have been understandable if Feld had just left it at that. But Feld did more to cushion the rest of the group against the deleterious effects of change. Well in advance of the high-profile Priceline ads, Feld hired actor William Shatner to make a training film for the Frito-Lay field force. "Shatner interviewed a number of the salesmen from the pilot group. They talked about how they were scared of the [HHCs] at first but how they'd never go back to paper. It really broke down the resistance to see their peers talking about it like that," says Feld.

The official rollout began in 1986, and soon the sales reps were sucking up the HHCs as fast as they could get them. When the application began to take hold and busi-



Doug Fields, vice president for UPS, had to build radio towers and construct a radio network for transmission services.

things Feld did when he left IBM and joined Plano, Texas-based Frito-Lay as CIO in 1981 was to kick off a major R&D project.

By 1984, the team had identified Fujitsu, Norand and MSI as potential vendors of HHCs for use by the field salespeople (who also delivered the products). The project was slated to cost \$40 million (including hardware, development and training costs). "That was a fair piece of money back then,"

one percentage point, from 22 percent of sales to 21 percent of sales within one year.

The genius of the one-point program was that it forced Feld to get rock-solid buy-in from each sales division right out of the box. If sales managers were willing to cough up cost savings or precious sales increases, they had to want the HHCs pretty badly. And they did, because Feld's team sold them on the idea that the wireless system would cut

ness continued as usual, the atmosphere among sales reps became euphoric. "It was a pretty exciting time," recalls Feld.

The HHC application had immediate fringe benefits. For the first time, for example, Frito-Lay was able to change prices on products quickly and to have different prices for different geographic regions. Previously, with the paper forms, drivers had to fill out forms that were preprinted with price information. It would have been too cumbersome to change the prices on the forms often. The HHC system gave a lot more flexibility.

In the beginning, UPS was under contract with more than 100 cellular carriers. The cost was high...and managing 100 different providers was a nightmare.

Most of the reps were undoubtedly happy to get back their evening private time.

"The system paid for itself from day one," says Feld, because the sales force had agreed to give up 1 percent of their sales budgets to fund it. "But really, we justified it on the basis of operating necessity also. We couldn't continue to grow at the rate that we had been without putting some kind of system in place."

Of course, it wasn't all smooth sailing. Upgrading the application meant changing the hardware as well as the application itself in certain situations. For every major change (about once a year or so), Feld and his team had to go through the painstaking process of getting all the devices back from the thousands of field service reps and then deploying a whole new round of devices. It was tedious, time-consuming and expensive. "If we decided to put a new application scheme on the handheld, our cycle time was about a year to get the new application burned into the programmable memory," Feld remembers, grateful the days of hardware-centricity are past. (And now the Internet has smoothed the task of

software distribution beyond anything he could ever have imagined.)

The Consortium from Hell

UPS also had to go to extraordinary lengths in its wireless efforts. With the rollout of its DIAD I in 1990—a project that cost \$350 million for research, development and deployment—Atlanta-based UPS needed to find wireless communication capability so that the drivers could transmit information continuously on collection rather than going back to a central location at the end of the

day to manually upload the data. The options at the time were to buy radio transmission services (but this was mostly in metropolitan service areas, or only 40 percent of UPS's delivery area), use the nascent public cellular carriers or build their own radio towers and construct their own network. UPS chose the second option.

At the time, there were about 200 independent cellular carriers (each market had the local phone company plus a private carrier) covering about 90 percent of the geographic area of the North American United States. In the beginning, UPS was under contract with more than 100 cellular carriers. The cost was high. Vendors charged a lot to their few customers in order to recoup the costs of building their own networks. And managing 100 different providers was a nightmare. In order to get a reasonable price for the services and reduce the management headaches, Fields decided it would be best to get their top cellular carriers to band together in a consortium to serve UPS. The value proposition to the vendors was that it was a painless way for them to add more than 65,000 daily users to their service with-

out much in the way of incremental cost of sale. UPS would get lower costs and less paperwork.

So Fields and other UPS IT managers approached their top cellular carriers—GTE, McCaw Cellular, Pacific Telephone and Southwestern Bell—and asked them to form a consortium called the JVMC (joint venture management committee). Asked what the initials stand for, Fields jokes, "The consortium from hell."

The rub was that the carriers operated under anti-price-fixing federal regulations that forbid collaboration among cellular carriers. Therefore, the UPS team was required to negotiate separately with each carrier. The idea was to end up at the same price without letting any carrier know exactly what price they'd reached with the others. Eight people from both sides were present at each negotiation, and UPS had to negotiate with four separate companies. Not surprisingly, the process ate up an entire year.

In the end, however, the cellular service was solid, the prices came down, and UPS was able to grow. "It was a remarkable thing. Going into it, I don't think we had that much confidence it could be done," says Fields. The consortium still exists. Today, UPS uses the national Motient satellite network from Motient Corp. as its primary wireless provider, but it also uses the consortium as a backup when the Motient network is down and in the few areas Motient doesn't cover.

Like Feld and Fields, Stephenson is proud of what his company built during the early days of wireless, when most companies' field service representatives were tethered to their head offices as if by an umbilical cord. "Society was not used to wireless then. There were no cellular phones, even. It was a whole different era back then," says Stephenson. **CIO**

Lauren Gibbons Paul, who frequently reports on new technologies, is a freelance writer based in Waban, Mass. You may contact her the wired way at laurenpaul@mediaone.net.

Here's a list of terms to help you understand the most important wireless technologies, standards and devices

COMPILED BY LEE PENDER
AND DANIELLE DUNNE

How to



THE WORLD OF WIRELESS applications and technologies, and its alphabet soup of acronyms, can be a confusing place. The bets your company makes on wireless technology will likely depend on where you work; they could also depend on how many different technologies your customers require you to support. Here they are.

3G (third generation)

An industry term used to describe the next, still-to-come generation of wireless applications. It represents a move from circuit-switched communications (where a device user has to dial in to a

network) to broadband, high-speed, packet-based wireless networks (which are always "on"). The first generation of wireless communications relied on analog technology (see *Analog*), followed by digital wireless communica-

tions. The third generation expands the digital premise by bringing high-speed connections and increasing reliability.

802.11 A family of wireless specifications developed by a

working group of The Institute of Electrical and Electronics Engineers. These specifications are used to manage packet traffic over a network and ensure that packets do not collide—which could result in loss of

ILLUSTRATIONS BY DOUG ROSS

Speak Wireless



data—while traveling from their point of origin to their destination (that is, from device to device).

AMPS (advanced mobile phone service) A term used for analog technologies, the

first generation of wireless technologies.

Analog Radio signals that are converted into a format that allows them to carry data. While cellular phones and other wireless devices still use analog

in geographic areas where there is little or no coverage by digital networks, analog will eventually give way to faster digital networks, analysts say.

Bandwidth The size of a network “pipe” or channel for

communications in wired networks. In wireless, it refers to the range of available frequencies that can carry a signal.

BlackBerry Two-way wireless device, made by Waterloo,



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Ontario-based Research in Motion, that allows users to check e-mail and voice mail (translated into text), as well as page other users via a wireless network service. Also known as a RIM device, it has a miniature qwerty keyboard for users to type their messages. It uses the SMS protocol (see *SMS*). BlackBerry users must subscribe to a wireless service that allows for data transmission.

Bluetooth A short-range wireless specification that allows for radio connections between devices within a 30-foot range of each other. The name comes from 10th-century Danish King Harald Blåtand (Bluetooth), who unified Denmark and Norway.

CDMA (code division multiple access) U.S. wireless carriers, such as Sprint PCS and Verizon, use CDMA to allocate bandwidth for users of digital wireless devices. CDMA distinguishes between multiple transmissions carried simultaneously on a single wireless signal. It carries the transmissions on that signal, freeing network room for the wireless carrier and providing interference-free calls for the user.

Several versions of the standard are still under development. CDMA promises to open up network capacity for wireless carriers and improve the quality of wireless messages and users' access to the wireless airwaves. It's an alternative to GSM, which is popular in Europe and Asia (see *GSM*).

CDPD (cellular digital packet data) Telecommunications companies can use CDPD to transfer data on unused cellular networks to users. If one section, or "cell," of the network is overtaxed, CDPD automatically allows for the reallocation of resources.

Cellular Technology that sends analog or digital transmissions from transmitters that have areas of coverage called cells. As a user of a cellular phone moves between transmitters from one cell to another, the user's call travels from transmitter to transmitter uninterrupted.

Circuit switched Used by wireless carriers, this method lets a user connect to a network or the Internet by dialing in, such as with a traditional phone line. It's a

dial-in Internet service provider for wireless device users. Circuit-switched connections can be slow and unreliable compared with packet-switched networks, but for now circuit-switched networks are the primary method of Internet and network access for wireless users in the United States (see *Packet-switched network*).

Dual-band mobile phone Phones that support both analog and digital technologies by picking up analog signals when digital signals fade. Most mobile phones are not dual-band.

EDGE (enhanced data GSM environment) A faster version of the GSM standard. It is faster than GSM because it can carry messages using broadband networks that employ more bandwidth than standard GSM networks (see *GSM*).

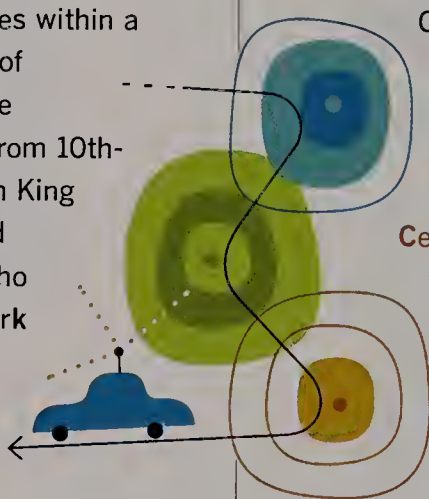
FDMA (frequency division multiple access) An analog standard that lets multiple users access a group of radio frequency bands and eliminates interference of message traffic.

Frequency hopping spread spectrum A method by which a carrier spreads out packets of information (voice or data)

over different frequencies. For example, a phone call is carried on several different frequencies so that when one frequency is lost another picks up the call without breaking the connection.

GPRS (general packet radio service) A technology that sends packets of data across a wireless network at speeds of up to 114Kbps. It is a step up from the circuit-switched method; wireless users do not have to dial in to networks to download information. With GPRS, wireless devices are always on—they can receive and send information without dial-ins. GPRS is designed to work with GSM.

GSM (global system for mobile communications) A standard for how data is coded and transferred through the wireless spectrum. The European wireless standard also used in Asia, GSM is an alternative to CDMA. GSM digitizes and compresses data and sends it down a channel with two other streams of user data. The standard is based on time division multiple access (see *TDMA*).



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HDML (handheld device markup language) It uses hypertext transfer protocol (HTTP, the underlying protocol for the Web) to allow for the display of text versions of webpages on wireless devices. Unlike wireless markup language (see WML), HDML is not based on XML. HDML also does not allow developers to use scripts, while WML employs its own version of JavaScript. Phone.com, now part of Openwave Systems, developed HDML and offers it free of charge. Website developers using HDML must recode their webpages in this language to tailor them for the smaller screens of handhelds.

I-Mode A wildly popular service in Japan for transferring packet-based data to handheld devices. I-Mode is based on a compact version of HTML and does not use WAP (see WAP), setting it apart from other widely used transmission methods. I-Mode's creator, NTT DoCoMo of Tokyo, agreed in November 2000 to pay \$9.8 billion to buy 16 percent of AT&T Wireless. Since then, AT&T Wireless has talked about bringing I-Mode to the United States by the end of

2001—a daunting prospect that requires the rebuilding of U.S. wireless networks, analysts say. DoCoMo is developing a version of I-Mode that supports the WAP standard.

Integrated Digital Enhanced Network (iDEN)

A technology that allows users to access phone calls, two-way radio transmissions, paging and data transmissions from one wireless device.

Developed by Motorola, iDEN is based on TDMA. Services based on the technology are available in North America (offered by Nextel), South America and parts of Asia (see TDMA).

Kbps (kilobits per second) A measurement of bandwidth in the United States.

Packet A chunk of data that is sent over a network,

whether it's the Internet or wireless network. Packet data is the basis for packet-switched networks, which are under development in the United States as a faster, more reliable method of transferring wireless data than a circuit-switched network. Packet-switched networks eliminate the need to dial in to send or receive information because they are

"always on," transferring data without the need to dial. The packets that hold data depend on the size of the data involved; "chunks" are broken down into an efficient size for routing. Each of these packets has a separate number and carries the Internet address for which it is destined.

Packet-switched network

Networks that transfer packets of data (see *Packet*).

PCS (personal communications services) An alternative to cellular, PCS works like cellular technology because it sends calls from transmitter to transmitter as a caller moves. But PCS uses its own network, not a cellular network, and offers fewer "blind spots"—areas in which access to calls is not available—than cellular. PCS transmitters are generally closer together than their cellular counterparts.

PDA (personal digital assistant)

Mobile, handheld devices—such as the Palm series and Handspring Visors—that give users access to text-based information. Users can synchronize their PDAs with a PC or network; some models support wireless

communication to retrieve and send e-mail and get information from the Web.

Radio frequency devices

These devices use radio frequencies to transmit data. One typical use: a bar code scanner gathers information about products in stock or ready for shipment in a warehouse or distribution center and sends them to a database or ERP system.

Satellite phone Phones that connect callers via satellite. The idea behind a satellite phone is to give users a worldwide alternative to sometimes unreliable digital and analog connections. So far, such services have proven very costly and have appealed to few users aside from, for example, the crews at deep-sea oil rigs with phones configured to connect to a satellite service.

Smart phone A combination of a mobile phone and a PDA, smart phones allow users to converse as well as perform tasks, such as accessing the Internet wirelessly and storing contacts in

databases. Smart phones have a PDA-like screen. As smart phone technology



2:26 p.m.

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matures, some analysts expect these devices to prevail among wireless users. A PDA equipped with an Internet connection could be considered a smart phone. Ericsson, Nokia and Motorola also make smart phones.

SMS (short messaging service)

A service through which users can send text-based messages from one device to another (see *BlackBerry*). The message—up to 160 characters—appears on the screen of the receiving device. SMS works with GSM networks.

TDMA (time division multiple access) This protocol allows large numbers of users to access one radio frequency by allocating time slots for use to multiple voice or data calls. TDMA breaks down data transmission, such as a phone conversation, into fragments and transmits each fragment in a short burst, assigning each fragment a time slot. With a cell phone, the caller would not detect this fragmentation. Whereas CDMA (which is used more frequently in the United States) breaks down calls on a signal by

codes, TDMA breaks them down by time. The result in both cases: increased network capacity for the wireless carrier and a lack of interference for the caller.

TDMA works with GSM and digital cellular services.

WAP (wireless application protocol) WAP is a set of protocols that lets users of mobile phones and other digital wireless devices access

Internet content, check voice mail and e-mail, receive text of faxes and conduct transactions. WAP works with multiple standards, including CDMA and GSM. Not all mobile devices support WAP, but IDC (a sister company to *CIO's* publisher, CXO Media) projects that more than 1.3 billion wireless Internet users will have WAP-capable devices in their hands by 2004.

WASP (wireless application service provider) These vendors provide hosted wireless applications so that companies will not have to build their own sophisticated wireless infrastructures.

Vendors include Etrieve and Wireless Knowledge.

WCDMA (wideband CDMA)

A third-generation wireless technology under development that allows for high-speed, high-quality data transmission. Derived from CDMA, WCDMA digitizes and transmits wireless data over a broad range of frequencies. It requires more bandwidth than CDMA but offers faster transmission because it optimizes the use of multiple wireless signals—not just one, as with CDMA.

Wireless LAN It uses radio frequency technology to transmit network messages through the air for relatively short distances, like across an office building or college campus. A wireless LAN can serve as a replacement for or extension to a wired LAN.

Wireless spectrum A band of frequencies where wireless signals travel carrying voice and data information. Wireless carriers are bidding at Federal Communications Commission auctions on slivers of airwaves through which they will ultimately be able to send third-generation communications. The

auctions, which began in December 2000 in the United States and already occurred in several European nations, will give providers access to new pieces of the spectrum that will allow them to move to third-generation services. More auctions relevant to 3G communications are on tap (see 3G).

WISP (wireless Internet service provider) A vendor that specializes in providing wireless Internet access.

WML (wireless markup language) A version of HDML, WML is based on XML and will run with its own version of JavaScript. Wireless application developers use WML to repurpose content for wireless devices.

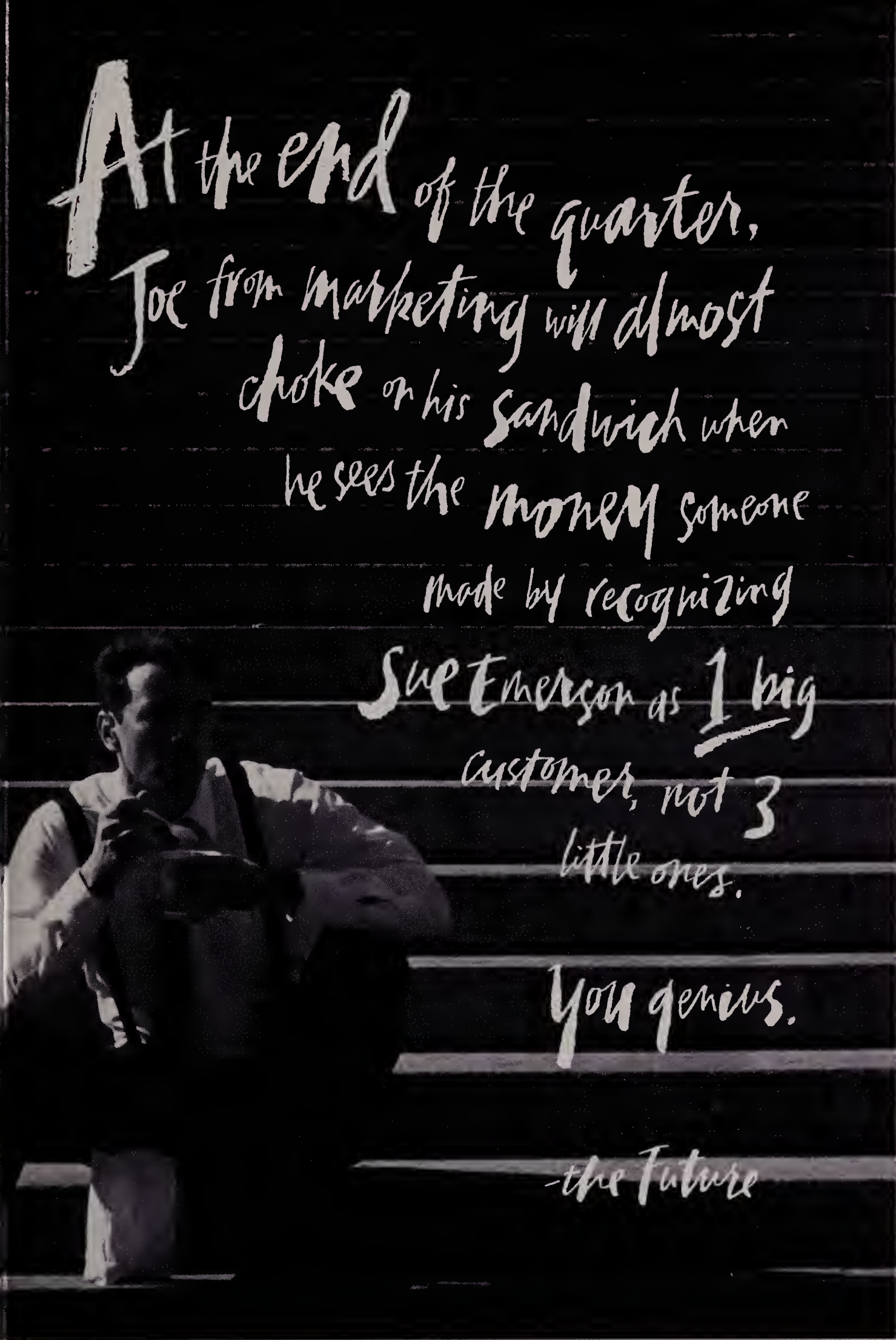
Z! Because we promised you a list from A to Z. **CIO**

Let us know if you found this glossary useful. Send an e-mail to Senior Writer Lee Pender (lpender@cio.com) and Web Writer Danielle Dunne (ddunne@cio.com).

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PRIVACY ASSURED

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BY LEE PENDER AND LORRAINE COSGROVE WARE

ZACK TAYLOR IS MAKING PLANS to let PDA-toting colleagues in the field file paperless reports back to the office. But Taylor, the security officer and network manager for the Environmental Protection Agency's regional office in Kansas City, Kan., is proceeding with some big-time security reservations. "Somebody can come by with an antenna and start monitoring [information transmitted wirelessly] because this stuff is not encrypted," Taylor says. (To read more about this situation, see "Time to Get Nervous," Page 102.)

Taylor's mix of excitement and concern is emblematic of his peers across a range of industries. Taylor was among 170 IT executives who told *CIO* about their wireless plans in our reality-check survey. The survey found that wireless is firmly on the 2001 agenda, but con-

cerns persist among IT executives about integrating the technology with existing wired systems and providing security for wireless applications.

A whopping 84 percent of respondents said they support applications now or plan to implement wireless

projects in the next 15 months. The rest (25 respondents) have no wireless projects on tap or planned to start after mid-2002.

Among those using wireless now (65 of the respondents, or 38 percent), employee-oriented applications, as opposed to B2B or B2C tie-ins, were the most prevalent. IT executives cited their support applications, such as e-mail, personal productivity and applications for sales force field staff to submit sales data and manage their customer contact information (see chart 1).

Those with active wireless applications run a gamut of technology protocols and standards, with U.S. cellular phone leader code division multiple

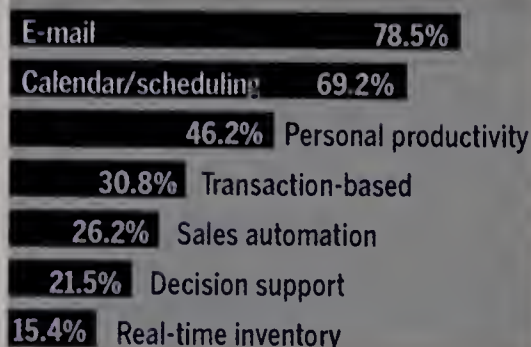
Survey results below show that the 65 respondents using wireless technology support mar

Survey methodology:

CIO administered an online survey from Dec. 8-18, 2000, selecting CIOs, vice presidents, directors and managers of IT from *CIO*'s circulation file and inviting them by e-mail to take the survey. We received 170 responses from executives at organizations ranging in size from less than \$50 million to more than \$10 billion in revenues.

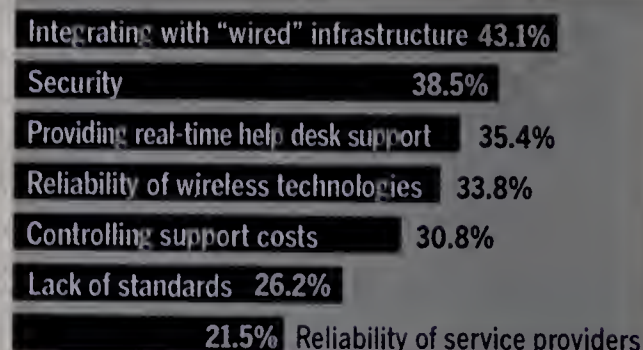
1

What types of wireless applications does your IT organization support currently?



2

What are your top three challenges in supporting or managing wireless technologies?



Gee Whiz

Our exclusive survey finds most IT executives have wireless projects in place or plans on tap, with eyes focused on the technology's weaknesses as well as its rewards

access (CDMA) and wireless application protocol (WAP) topping the list (see chart 4). Wireless-enabled PDAs, such as the Palm and BlackBerry, are the devices of choice, ahead of pagers, and digital and analog mobile phones (see chart 5).

When asked to name the top challenges in supporting wireless technology, these IT executives hit on familiar themes: system integration, security, end user support and reliability (see chart 2). Within this group of respondents were 28 who represented companies that have implemented applications that allow their customers to access information using wireless devices. This subsection of respondents puts security at the top of its list of challenges (see chart 3).

Find Out More...

For complete survey results, check out our website at www.cio.com/printlinks.

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In the face of such significant obstacles, why are several companies moving ahead? Scott Rynd, vice president for technology services at Brink's Home Security in Irving, Texas, says that for starters he sees a chance to make sales agents in 98 local markets around the nation become more productive using wireless for presentations, scheduling

and other functions. A pilot project at Brink's has select field representatives equipped with Palm VII handhelds and NEC Mobile Pro 880 laptops.

Rynd also cites a more subtle benefit: image. "We want [our salespeople] to walk into a home and instantly have the customer recognize us as a technological leader," he says. "We don't want to look stodgy. No more cardboard presentations."

Rynd says he knows that quality of service will be a very important issue; wireless transmission speeds are slower than back at an office workstation. But Rynd is charged with working out the kinks while his company presses on with wireless. **CIO**

standards and devices and stress in-house applications. They peg system integration and security as top concerns.

3 What do you think are the biggest challenges of wireless applications that allow customers to access information?

Security of customer systems	50.8%
Performance	49.2%
Bandwidth	44.6%
Support for customers	43.1%
Reliability of technology	33.8%
Real-time access to information	26.2%

4 What wireless protocols or standards are you using?

CDMA (code division multiple access)	50.8%
WAP (wireless application protocol)	49.2%
TDMA (time division multiple access)	35.4%
CDPD (cellular digital packet data)	33.8%
GSM (global system for mobile)	27.7%
Don't know	27.7%

5 Which wireless devices does your organization support currently?

PDA w/wireless connectivity capabilities	98.5%
Pager	78.5%
Digital wireless phone	64.6%
Cellular (analog) phone	61.5%
Laptop w/wireless modem	56.9%
Dual band (digital/cell) phone	44.6%
Smart phone (w/Internet connectivity)	27.7%



wireless

Q&A WITH MICHAEL DERTOUZOS

The Invisible Ball and Chain

Wireless devices may give us greater productivity and freedom, but only if people have the power to turn them off

BY DEBBY YOUNG

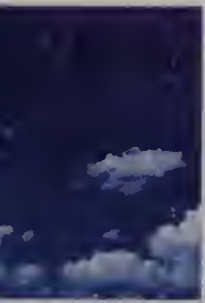
WITH WIRELESS DEVICES taking over the world (last year Nokia alone sold almost 120 million cell phones globally), CIO went looking for a visionary who could tell us how wireless will change the way we communicate, do business and conduct our lives. We found Michael Dertouzos, director of the MIT Laboratory for Computer Science and the man behind the Oxygen Alliance, a consortium of big-name companies and brilliant academic minds that are collaborating to make computers "as natural a part of our environment as the air we breathe." In his latest book, *The Unfinished Revolution: Human Centered Computers and What They Can Do for Us*, Dertouzos deplores the unfriendly nature of current machines—wireless included—and advocates for simpler, more human-centric computing.

During a recent visit to his MIT office, Dertouzos, 64, demonstrated some of the friendlier devices his lab has in mind. First he asked Jupiter, the MIT lab's weather information system, for the next day's weather forecast. A slightly stilted, digitized voice promptly gave

PHOTOGRAPHY BY WEBB CHAPPELL



Michael Dertouzos
*is director of the MIT
Laboratory for
Computer Science and
the man behind the
Oxygen Alliance.*



us the forecast and then graciously inquired if it could help Dertouzos with something else. Voyager, another voice-controlled system, told us the traffic pattern on Storrow Drive, one of Boston's busiest thoroughfares, up to the last 5 minutes. And a third device, aptly named Pegasus, replied to Dertouzos' request for any flights from Chicago to Boston that day, arriving around 11:00 a.m. with, "There is only one flight that meets your specifications. United Flight 504 from O'Hare landed in Boston at 10:42 a.m. local time. It is 17 minutes ahead of schedule." But even Dertouzos, who paraded these technologies with the pride of a father showing off his children, concludes that wireless is not going to radically change the world as we know it; although the new technologies may bring in their wake some less than welcome trends.

CIO: In your book, you write about the confusion and frustration growing in proportion to the gadgets that surround us. And yet you're such a strong advocate for the power of IT to better our lives. Is wireless technology making the world better or worse?

Dertouzos: Wireless' best attributes match the human ability to move and can convey information, regardless of where and when. And that's important. Wherever you are and whenever you need to be reached, information can be conveyed to you. You can access the Internet, or you can talk to your child. At the technical level, the primary disadvantages are that wireless is not very high-speed, the screens are too small, and the amount of information is limited. At the social level, there are some disruptions and changes when you start to have human beings at the tentacles of communication pipes, because now they're reachable all the time. You're out there enjoying the sunset and the damn thing rings.

Just because we have become interconnected, we have not earned the automatic right to bother anyone we want with our e-mails or phone calls. Nor have we acquired the automatic obligation to

respond to messages from others. Just because you are interconnected, you shouldn't mindlessly respond to every push button. Disconnect if you don't want to be bothered. If the sunset is taking place, turn the damn thing off.

How does this advice reconcile with the growing trend in the business world for 24/7 access to everyone?

I could see that in some corporate situations people will say, "I've got to be able to reach you anytime I want to." And then, of course, you've got to decide if that's the kind of life you want to lead. Is it time to leave the company? Or do you want to have your

gain more and more high-speed communication—something we all want—you can either pump more power into your device, which costs a lot, or you can make the cell size [the geographic area served by a cellular tower signal], the antenna and the surrounding things that can hear the antenna, smaller. Today a cell size is [maybe] 30 miles. When one antenna handles all the cars and mobile users in a 30-mile radius, it cannot give you much speed; it's got to proportion what it has. But suppose that instead of one antenna handling a 30-mile radius, several antennas spoke to one city block worth of people and cars? They're sitting up on telephone poles or electric company poles within a few blocks of

Just because we have become interconnected, we have not earned the right to bother anyone we want with our e-mails or phone calls.

union fight it? If we take wireless technology and use it as an oppressive tool to keep tabs on human beings, to rein them tighter to the corporate center, I think we'll fail. If we use wireless technology to empower the individual freedoms of human beings, we will win. It's the difference between the Henry Ford era, where workers were treated as interchangeable parts, and the post-Ford modern era, in which workers count and have to be treated with tremendous respect and given the ability to improve the whole corporation by their own sort of individualism. The companies with that understanding are the best companies in the world today.

As the number of users continues to explode, how will wireless networking technology evolve to keep pace? After all, we already have a lot of wireless dropout—even in metropolitan areas.

We think of wireless as things that move. But the ultimate place we're going with all this is to build a huge, fixed antenna system. To

each other. Now you can have huge bandwidth and accommodate lots of people using little baby wirelesses with small batteries. You could have a conversation that lasts an hour as you move through several cells, but this is in urban and quasiurban centers. As you go to the deep countryside or to the oceans of the world, you're not going to have that. You will always rely on other media, such as a satellite, which is also wireless, although slower, but at least with that you can reach the remotest parts of the world.

Tomorrow's network is not going to be 100 percent wireless. Everybody is going to win. You're going to have wired networks up the wazoo. You're going to have glass fibers going to stationary antennas. You're going to have coaxial cables. You're going to have wiring like crazy in the urban and quasiurban areas because that gives you speed. It's cheap, and it communicates nicely from one wired location to another. Then you're going to have a lot of wireless with local range. And you're going to have satellites for the remote parts of the world.



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Answers beyond the numbers.™



There's already a lot of controversy about the impact of cellular towers and wireless transmissions on people's health. Do you really think communities will allow the technology to be as ubiquitous as you propose?

I'm not advocating that we should adopt that model, I'm simply observing that this is where we're headed. I don't see the com-

26-letter alphabet], designing experimental speech understanding systems for Mandarin Chinese is no more complex than designing those that understand English.

In addition, we can use the low Earth orbit satellites whipping around the world to provide a backbone of wireless communications to underdeveloped countries. These satellites fly over Africa and India as often

there are several ways of doing this. One is that as soon as you enter the building, you broadcast to your computer and everybody knows you're there, but you may not want others to know you've arrived. Yet the minute you broadcast your presence in the

Wireless should make the work environment more seamless. Microphones, for instance, will pick up your voice wherever you are.

munity protests being higher than the greed for self-gratification and having toys to play with. Do we know that these things are dangerous? If we do, that's why we elect governments and put regulatory agencies together to protect us from such things. But after 50 years in the electronic business, we don't have a solid piece of information as to whether this wireless activity is dangerous to our health.

Currently less than 5 percent of the world uses the Internet. How will wireless technology reach the disenfranchised?

The fascinating thing about wireless is that it can carry speech. Speech can bridge the gap between the illiterates and the literates and the [technological] gap between the Chinese and the English. Think about trendy handheld PDAs that demand that you learn entire new sets of commands when you write on their little screens so that their programs can understand you. Compare that to the H21 [a handheld device developed in Dertouzos' lab] that has no keypad of any kind. You communicate with the H21 through spoken dialogue and by viewing what it shows you. Although keyboards for typing Chinese ideograms are far more complex than those for typing English [100,000 ideograms versus our

as they fly over New York. Right now, when they're over Africa and Asia, they're not busy and the marginal cost to leave them on is very low. There is so much more we could do with tax credits from the rich countries to the poor, with private donations, with training, with companies donating equipment. There is a hell of a lot we can do if we have the will.

What kind of changes do you foresee in the way we work and live?

Wireless is just a medium. All it will do is give people on the go the same capabilities that they now have when they're sitting in their offices. But in 10 or 20 years' time, it should make the work environment more seamless. Microphones, for instance, will pick up your voice wherever you are: in the office, at home, in the car. Again, though, we have to make sure we develop this technology to empower people, not machines. Let me give you an example: When you enter a friendly building in the middle of the 21st century, your computer should be able to know what computer resources are around so that it can use them. You've been dictating and have documents, perhaps 30 pages of important stuff, plus some voice and video fragments. You'd like to say, "Let's print this on the nearest computer." Now,



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building, you're vulnerable. In our laboratory, we did it the other way. All the resources are broadcasting their existence. No human is broadcasting his existence. So when I enter a building, every resource, every printer, every fax machine, every computer in the building is broadcasting, "Here I am! Here I am!" every 20 seconds. As I walk into the building, my computer can measure the difference between signals and know how far a resource is. After I walk around, I have a complete map in my computer of all the resources in the building without anybody knowing that I'm in the building. This is a human-centric position.

Wireless may also have an impact on the way jobs are distributed in the future. Much like we transferred a lot of our manufacturing to Taiwan and Southeast Asia in the 1970s and '80s, I envision wireless technology enabling a huge transfer of office work

[which comprises 70 percent of what we do in our economy] outside of the United States and England, the English-speaking countries or the rich countries of the world, to the ones who are very hungry. It's an interesting situation in that labor from a hungry nation can be proffered across national boundaries to a rich nation. It's going to be a massive redistribution of work—everything from customer service and transcribing to mortgage application checking and insurance adjusting.

But if all this routine office work goes overseas a lot of Americans will lose their jobs. Is that a good thing?

Some U.S. office jobs will be lost to foreign office workers just like some manufacturing jobs were lost to East Asia. That's an inevitable consequence of the lower costs abroad. Short term, the impact will be pos-

itive for poor foreign nations who will see their GDP grow as spectacularly as did Taiwan's in the past two decades. The loss of U.S. jobs will have a short-term negative impact both economically and psychologically for those who are displaced here. But as in the industrial era, U.S. workers will move further up the chain, offering sophisticated services, as opposed to the more routine and clerical ones that will be shipped abroad. Long term, I believe both the developing and the developed nations will benefit from the upward economic surge that results from the increased benefits associated with wireless technology. **CIO**

What do you see in the wireless crystal ball? Let Senior Editor Alison Bass know at abass@cio.com. Debby Young is a freelance writer in Framingham, Mass. E-mail her at dscribe@erols.com.

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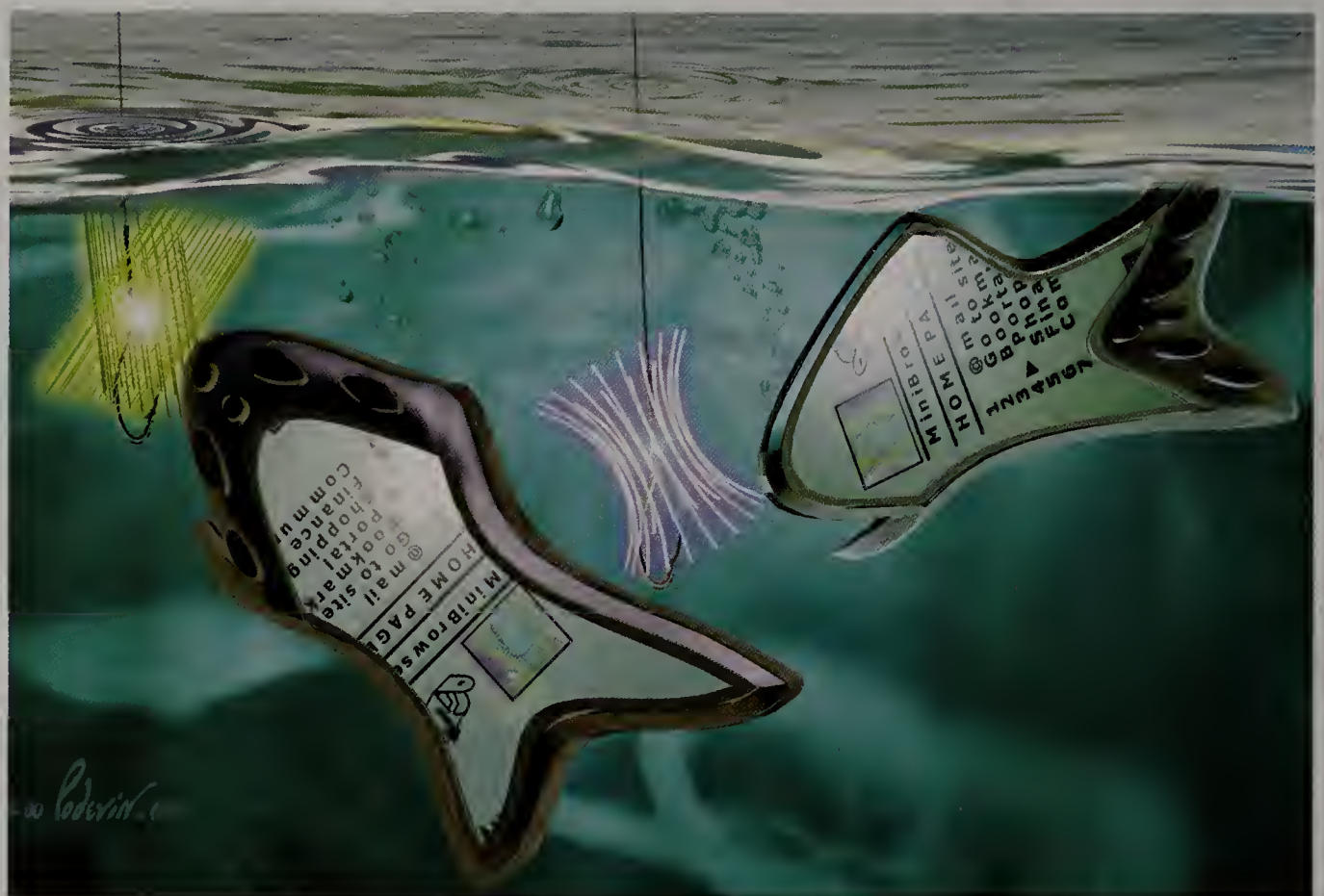


Emerging technology

INNOVATION and PRODUCTS in the VANGUARD

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High Speed, Low Cost

*The new generation of data access providers offers great deals—
but at what price?* BY DAN SWEENEY

Edited by Christopher Lindquist. Send your thoughts and ideas for future columns to et@cio.com.

DESPITE ALL THE TALK of competition in the high-speed access space since the passage of the Telecommunications Act of 1996, there haven't been many competitive offerings available to most enterprises, at least not in terms of the last-mile

connection to the nearest Internet point of presence. For most businesses, the only real choice has been the local telephone company's venerable T1 connection—a couple dozen pairs of ordinary copper phone lines aggregated into a bundle that

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Without *B*oundaries:

THE CIO IN THE NEW WORLD

april

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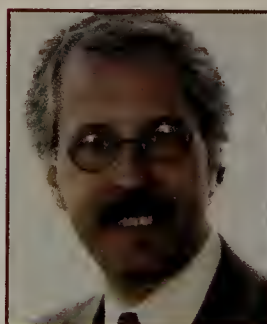
JOIN US AS WE EXPLORE

the forces

shaping this dynamic environment, and examine the resulting intersection of IT with a whole new host of legal, ethical, cultural, human resource, and business issues. We'll look at how the near and long-term future of technology will only accelerate these processes.

In this turbulent new world, we'll need to continuously re-evaluate and reinvent — maybe even get revolutionary. And who better to lead the revolution than Gary Hamel, the man *The Economist* calls “the world's reigning strategy guru.” Hamel will help us cross the boundaries between old and new ways of thinking about strategy innovation, wealth creation, and the

very process of continuous re-invention. He'll deliver Tuesday afternoon's keynote address, and will be on hand afterward during a networking reception. Participants will receive a signed copy of Hamel's newest book, *Leading The Revolution*.



Gary Hamel
Author
Leading The Revolution

Joanne Ciulla, author of *The Working Life: The Promise and Betrayal of Modern Work*, questions where we're heading as a society — and what that means for us as employees and employers. We'll examine how new technologies are blurring the line between our work and personal lives.

Without *Boundaries:*

THE CIO IN THE NEW WORLD

Hackers and cyber terrorists recognize no boundaries. **Stephen Colo**, CIO of the US Secret Service, will continue our series of dialogues with The US Department of Commerce's Critical Infrastructure Assurance Office (CIAO) to discuss what business leaders, CIOs, and government agencies can and should be doing to protect against future attacks.

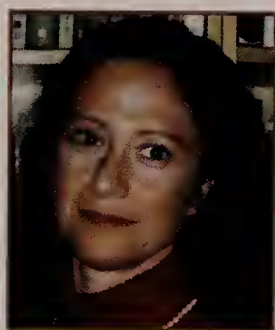
Edward Nesta, senior vice president of Operations and CIO of The Leading Hotels of the World, suggests how we can use technology to level the playing field when different countries, cultures and personnel are involved in selling and supporting products and services. **Mike Ragunas**, CTO of Staples.com, shares how we can implement and leverage technologies across sales channels, partners, suppliers and customers to improve service. NASDAQ's CIO **Gregor Bailer** and CTO **Steven Randich** exemplify some of the shifts taking place within the IT organization, where an increasingly complex set of responsibilities demands creative structures. Conference moderator **Dr. Jim Wetherbe** provides practical insight on rethinking and redesigning organizations and their boundaries.

A panel of emerging market CIOs from

around the world, moderated by **Martha Gorman** of the Global IT Knowledge Forum, examines how we can work together to lessen the digital divide between the technological haves and have-nots around the world, and why that's critical to a healthy global economy.

Rick Richardson, president of Richardson Media & Technologies, looks at the new trends in technology, and offers his forecast for the future. And, Venture OnStageSM, moderated by CIO Magazine Technical Editor **Chris Lindquist**, once again brings five visionaries to talk about what their new technologies, products or services can do for CIOs.

But don't forget the fun stuff: Tee off Sunday morning at the Leaderboard Classic Golf Tournament hosted by Lockheed Martin and Intira Corporation. Network Sunday night at the Welcome Reception, and then laugh 'til you hurt at an Evening at the Improv, hosted by Information Builders. More activities will be scheduled throughout the event, capped off Tuesday night by the CIO-sponsored Reception and Dinner followed by Monte Carlo: An evening of High Rolling, Cool Jazz & Sweet Cigars hosted by Symantec Corporation.



Joanne Ciulla
Author
*The Working Life:
The Promise and
Betrayal of
Modern Work*

agenda

SUNDAY, APRIL 22

8:00 am - 1:30 pm

Leaderboard Classic Golf Tournament
Hosted by Lockheed Martin and Intira Corporation

2:00 pm - 6:00 pm

Informal Networking

2:00 pm - 5:00 pm

Registration

6:00 pm - 8:00 pm

Registration & Welcome Reception

Get connected: Meet your fellow participants, featured presenters, CIO staff, and Corporate Hosts.

8:00 pm - 10:00 pm

Evening @ The Improv

Hosted by Information Builders

Back by popular demand, Information Builders presents "A Night at the Improv." Join us for an evening of sidesplitting fun — direct from the world-famous Improv Comedy Club in L.A.!

10:00 pm - Midnight

Hospitalities/Networking

MONDAY, APRIL 23

7:30 am - 8:30 am

Breakfast

8:30 am - 8:45 am

Welcome and Opening Remarks



Gary Beach
Group Publisher
CXO Media Inc.

8:45 am - 9:30 am

Breaking the Boundaries



Moderator:
Dr. Jim Wetherbe
Professor of IT
Texas Tech University

Most organizations are based upon 18th century accounting systems and 19th and early 20th century industrial organizational structure. Both interfere with performance and employee satisfaction. The 21st century knowledge-based economy requires organizational design and leadership that breaks down the borders between interorganizational boundaries similar to the way business reengineering broke down the boundaries between intra-organizational functions in the 1990's. Wetherbe will set the stage for the conference and provide practical insight on rethinking and redesigning organizations and their boundaries.

9:30 am - 10:30 am

Integration across Enterprises



Mike Ragunas
CTO
Staples.com

E-business is a core component of any business strategy today. For companies to get ahead in today's e-economy, e-business initiatives must eliminate boundaries to create a seamless organization. Staples has been recognized for its success in implementing and leveraging technologies that integrate information across sales channels in its own organization, with partners, suppliers and most importantly, customers. This session will discuss ideas on how technology can drive your business and how Staples has leveraged XML and other technologies to successfully integrate across enterprises, resulting in improved customer service.

10:30 am - 11:00 am

Coffee Break

11:00 am - 11:45 am

Business Briefings

Our Corporate Hosts and their clients discuss technologies and services to improve your enterprise's performance.

11:55 am - 12:40 pm

Business Briefings

12:45 pm - 2:00 pm

Working Lunch — Without Boundaries: The Law vs. Hackers and Cyber Terrorists

Stephen Colo
CIO
United States Secret Service

In the Internet world, hackers and cyber terrorists recognize no boundaries. Major hacker attacks are not only becoming more prevalent, but also far more dangerous to business and government. The US Department of Commerce's Critical Infrastructure Assurance Office (CIAO) asserts that business leaders and CIOs need to take more responsibility for systems and information security — but attacks will still happen. What help is available from law enforcement agencies and the legal system? And how can we help them help us?

2:15 pm - 3:00 pm

Business Briefings

3:15 pm - 4:15 pm

Without Boundaries: The Blurring Line Between Work and Life

Joanne Ciulla
Author
The Working Life: The Promise and Betrayal of Modern Work

Technology, the Internet and the global economy have created a 24/7 world. With laptops, cell phones, and a host of other handy gadgets, we can now work anytime, from anywhere. But just because we can, are we encouraged and expected to ... drag the laptop with us on vacation, have our office voice-mail forwarded to our personal cell phones, be virtually on-call all the time? The line between work and personal life gets blurry. Are we using these technologies to enrich our employees' lives by giving them more flexibility, or are we using them to pull the leashes to the office ever-tighter? What can and should we be doing to keep work from ruining our employees' lives?

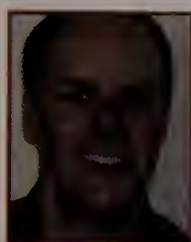
4:15 pm - 5:15 pm

Technology & Our eFuture

Dana R. (Rick) Richardson
President
Richardson Media & Technologies

Today's CIO is faced with an ever-changing future. It is one characterized by fewer traditional boundaries and being shaped by trends in hardware, software and communications. Rick Richardson will provide his vision of both our near and longer-term future as it relates to these trends, as well as new and emerging technologies that will help bring those trends to reality. Finally, Rick will put himself on the line with his forecasts of our technological future and where the new boundaries might be drawn.

5:15 pm - 6:00 pm

Venture OnStage

Moderator:
Christopher Lindquist
Technology Editor
CIO Magazine

Venture OnStage, introduced at our October *Perspectives*® conference, was a hit with the audience, so we're bringing another group of new technology visionaries to tell us what they think will be the next great thing.

6:00 pm - 7:00 pm

Networking Reception

7:00 pm - Midnight

Hospitalities/Networking

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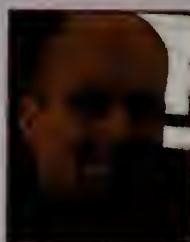
7:30 am - 8:30 am

Breakfast

8:30 am - 9:30 am

CIO vs. CTO: Where Do the Boundaries Lie?

Gregor Bailar
Executive Vice President & CIO
The Nasdaq Stock Market, Inc.



Steven Randich
Executive Vice President & CTO
The Nasdaq Stock Market, Inc.

There used to be a clear distinction between the CIO and CTO roles. The CIO was the business-savvy leader who helped the enterprise make wise technology investments, while the CTO was the chief lieutenant with a keen eye on emerging technologies that might help the business. Today the boundaries between the roles have blurred, creating confusion among business leaders: do they need a CIO, a CTO, or both? At NASDAQ, CIO Gregor Bailar recently hired CTO Steven Randich. They will discuss the distinction they see between the CIO and CTO roles, the boundaries and overlaps of their day-to-day duties, and how other businesses might address their own CIO/CTO needs.

9:30 am - 10:30 am

Beyond Borders: How Do We Level the Playing Field?

Edward F. Nesta
Senior Vice President of Operations & CIO
The Leading Hotels of The World

Technology can help level the playing field when different cultures, countries and personnel are involved in selling and supporting a company's product. CIOs have the responsibility for providing the tools, training and infrastructure that makes this possible — and for establishing and managing standards across time zones and cultures to create a consistent product. With the global reshaping that has resulted from the distribution of technology, the actions of CIOs, both economically and politically, are much more visible on the world stage. Their ability to support their respective business units, while also delivering a uniform and consistent product in the midst of these changes, is a necessity for both competitive and personal reasons.

10:30 am - 11:00 am

Coffee Break

11:00 am - 11:45 am

Business Briefings

11:55 am - 12:40 pm

Business Briefings

12:45 pm - 1:45 pm

Luncheon

2:00 pm - 3:00 pm

Narrowing the Digital Divide – International CIO Panel

Martha Gorman
Co-Founder
Global IT Knowledge Forum

Rather than create a world divided into information haves and have-nots, we must level the playing field for vast regions of the planet — or risk losing the contributions they can bring to the global economy. One way to accomplish this is bypassing expensive, intermediate solutions, in a process known as technological leapfrogging. Our panel of CIOs from emerging international markets discuss how we can work together to create the conditions needed to foster such technological leaps in key industries and regions.

Panelists:

Luiz Alberto Mourellos Rodriguez, Director TI, IDICT, La Habana, Cuba

Manuel E. Ruiz Gutierrez, MIS Manager, Dole Standard Fruit Co., Costa Rica

Wan Othman Wan Yahya, CEO, Integrated Document Services, Kuala Lumpur, Malaysia

Dr. Ian Kadish, IT Director, Netcare, South Africa

3:00 pm - 3:45 pm

Business Briefings

4:00 pm - 5:30 pm

Keynote: Strategy, Innovation and Continuous Reinvention**Gary Hamel***Author**Leading the Revolution, Competing for the Future*Visiting Professor of Strategic and International Management
London Business School

In an increasingly non-linear world, only non-linear strategies will create new wealth. Yet few companies seem able to spawn imaginative, wealth-creating strategies. Any company that wants to thrive in the turbulent new economy will have to learn how to harness the passion and imagination of every employee in the quest for strategy innovation. It will have to learn how to reinvent itself not once a decade, in the midst of a crisis, but year by year while still at the peak of performance. "Industry revolutionaries" are upending conventions and aggressive newcomers are challenging the orthodoxies of incumbents. In this topsy-turvy environment, irrelevancy may be a bigger risk than inefficiency.

5:30 pm - 5:45 pm

Closing Remarks by Moderator Dr. Jim Wetherbe

5:45 pm - 7:00 pm

Networking Reception with Gary Hamel

7:30 pm - 9:30 pm

**Dinner
Hosted by CIO**

9:30 pm - 11:00 pm

Monte Carlo: An Evening of High Rolling, Cool Jazz & Sweet Cigars
Boca Raton Beach Club
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Changing Privacy Issues to Opportunities

Given the continued growth of e-commerce, the proliferation of marketing databases and a surge of negative media attention, consumer privacy concerns and legislation continue to intensify. Businesses must address privacy issues quickly and legitimately or face the prospect of additional governmental regulation and rising consumer distrust. How can technology assist companies in implementing a pro-active consumer privacy strategy? Customer Data Integration (CDI) software can help companies honor individual privacy rights and manage customer preferences by integrating customer data across the enterprise — creating a single-view of the customer across multiple channels. This enables businesses to move beyond privacy protection and toward consumer advocacy. In this session, you will discover how true consumer advocacy represents a significant opportunity for businesses to improve customer loyalty, boost retention and increase market share.



AVAYA, the former Enterprise Networks Group of Lucent Technologies, is headquartered in Basking Ridge, N.J., USA, and is a leading provider of communications systems for enterprises, including businesses, government agencies and other organizations. Avaya offers voice, converged voice and data, customer relationship management, messaging, multi-service networking and structured cabling products and services. It is a worldwide leader in sales of messaging and structured cabling systems and a U.S. leader in sales of enterprise voice communications and call center systems. Avaya has nearly one million business customers in more than 90 countries, including more than three-quarters of the *Fortune* 500. For more information about Avaya, visit us on the Web at www.avaya.com.



John Stevenson
Vice President & CIO
Avaya

Moving a Corporation to a Forecasting Model 'Without Boundaries'

Many corporations, even in the new millennium, still await information that is historical in nature before making decisions that affect where the corporation needs to be prioritizing its resources. ERP applications have brought us real time information views across the corporation, but is that enough? To transform a corporation into a true forecasting organization takes information tools, seamless integration and a cultural transformation. Avaya is making this transformation. It is midway through the steps on its 18 month path from history gathering to a forecasting view of running its business. This session will focus on the tools, activities and cultural boundaries encountered in this transformation.



BLUE MARTINI
SOFTWARE

BLUE MARTINI SOFTWARE provides enterprise software applications to understand, target and interact with customers. Companies deploy the Blue Martini Customer Interaction System to interact with customers on the Web, via call centers, in stores, over wireless devices, through e-mail, direct mail and on marketplaces. Business people use the Blue Martini Customer Interaction System to manage products, content, transactions, analysis and personalization. Companies that interact directly with customers build their brands more effectively than those using only traditional media, resulting in increased revenues across all channels.

Monte Zweben
CEO & Founder
Blue Martini

Driving B2B Revenues: Direct, Indirect, and Trading Exchanges

According to AMR Research, B2B e-commerce should reach \$5.7 trillion in 2004 or 29% of the dollar value of all commercial transactions. B2B e-commerce will be huge and will have a significant impact on the enterprise. Thus, for most companies, it is not a question of whether they must participate in B2B e-commerce, but one of when and how. But what is B2B e-commerce? How do you achieve the promise of B2B e-commerce while complementing your existing channel models? Zweben leads a discussion on how to enable contract-based e-commerce relationships with your B2B customers, empower your resellers to sell better, and participate in trading exchanges without commoditization.



BRIO TECHNOLOGY provides a proven and reliable analytic software platform that enables companies to simplify the complex process of using corporate data to make better day-to-day decisions. Brio ONE products empower individuals, workgroups and executives in an organization to find, access, share, manage, and exchange information across an Internet enabled enterprise. More information can be found on our web site: www.brio.com or by calling 1-877-289-BRIO.



Katherine Glassey
Chief Strategy Officer
Brio Technology, Inc.

Without Limits: A 360° View of Your Enterprise

Today's changing business climate makes it essential that information is readily available and in actionable form at all levels of the organization. As competition continues to escalate, both large and small companies are having to analyze not only external factors (i.e. competition, marketshare, etc.) but its own operations, including expenses, sales, and profitability at a departmental level. Looking at it from a CIO's perspective, this discussion highlights how the market has changed, where it is going, and how an organization can become successful, one department at a time. Glassey shares how analytics are essential in today's leading organizations to become more efficient — empowering employees, partners and customers with the ability to access and analyze business information.



In business nearly 25 years, **CANDLE CORPORATION** is one of the world's largest independent global software companies specializing in fast, flexible e-business solutions. Operating in over 42 countries, Candle develops and markets over 300 products and services that enable companies to create, integrate, manage and measure the effectiveness of their e-businesses. Candle's solutions provide the speed, agility and performance that are mandatory for success in the world of e-business. Visit Candle at www.candle.com.



David Caddis
Vice President and
General Manager of
e-Business Assurance
Solutions
Candle Corporation

Customer Service in an e-Business World

As companies experience unprecedented online activity, CIOs are striving to ensure that their Web site and applications keep pace with the fast moving world of e-business. Caddis will explore best practices to guide CIOs in developing a business model for today's ever changing Internet economy while assuring the quality of service received by online customers.



CHANGEPOINT provides the most complete business process automation solution for IT services organizations to manage their people, projects and budgets more effectively and profitably. Designed specifically to address the needs of IT professional services organizations, corporate IT departments and the staffing companies they work with, Changepoint enables IT services organizations to better operate by automating and streamlining critical business processes for greater efficiency, and inter-operate by seamlessly integrating and collaborating with staffing suppliers, contractors, clients and partners.



Avery Cloud
Vice President and CIO
INTEGRIS Health

Courtesy of
Changepoint

The Changing Role of IT in Today's Corporate Culture

In today's information technology age, the IT department is not only relied upon to support the business, but to drive the business forward. Cloud offers his insight on the ways that IT now fits into the corporate culture, touching on how the relationship of professionals and the business operators has evolved over his 25 years of IT experience. Cloud will share some of his experiences on the role of technology in shaping the business plan and how that role should be defined, as well as outlining the new structure that IT organizations must adopt.



Chordiant

CHORDIANT delivers a unified CRM (customer relationship management) solution for companies with extreme customer demands in terms of volume, complexity and scope. By integrating multiple sources of information across an enterprise, Chordiant Unified CRM Solution provides a comprehensive, single view of the customer to ensure personalized one-to-one service. Regardless of the point of customer contact — email, telephone, wireless device, Internet — companies can make the most of every customer interaction, increase retention, grow revenues and drive profits.



Stephen Kelly
*President and Chief
Operating Officer*
Chordiant Software, Inc.

**Customer Relationship Management:
It's Not Just Software
Achieving Intelligent Customer
Communications Management**

The typical customer service experience has died under the weight of mass consumption and new e-Business distribution channels. Worldwide, the burden of inbound customer service requests threatens to bury companies facing extreme IT demands. In this hostile environment, proper management of each and every customer interaction has never been more critical to survival. Meeting these challenges head-on, many European consumer businesses, such as banks and financial services companies, are leading the way in exceeding customer expectations. In Europe, where CRM is considered a business strategy enrolling the use of an IT architecture to deliver this capability, it is referred to as "Intelligent Customer Communications Management." In his presentation, Kelly will describe this architecture and illustrate its use with real case studies of major European companies with which he has worked.



CITRIX SYSTEMS, INC. is a global leader in application server software and services that offer "Digital Independence" — the ability to run any application on any device over any connection, wireless to Web. Citrix solutions enable organizations of all types, from enterprises to application service providers (ASPs), to reach more users with more applications, and achieve this with greater speed, predictability and cost-effectiveness. Citrix offerings include MetaFrame application server software, NFuse application portal software, Management Services products and Independent Computing Architecture (ICA), a core application server technology. Citrix is headquartered in Fort Lauderdale, FL.

**Digital Independence through
Application Server Solutions**

By overcoming the traditional constraints and complexities of e-business technology, CIOs have the power to reach more users, with more applications, than ever before. By having the ability to run any application on any device with any connection, wireless to Web, CIOs may increase speed of operations with greater predictability and lower costs. As a result, organizations can compete most effectively in today's digital age — a dynamic age of e-business, the Internet and the continual addition and evolution of new applications, devices and services.



E. PIPHANY™

E. PIPHANY is a leading provider of intelligent customer interaction software for the Customer Economy. By providing an integrated suite of software solutions, E.piphany E.5 blends web-based analytic and operational CRM to unify all inbound and outbound marketing, sales and customer service interactions. E.piphany E.5 enables a single, enterprise-wide view of each customer to help global businesses better understand and proactively serve customers in real time. With worldwide headquarters in San Mateo, CA, E.piphany has regional operations and offices throughout the U.S., Europe and Asia Pacific.

Bill Walsh
*Executive Vice President and General
Manager, International*
E.piphany

**CRM: A Technology without
Boundaries**

Today's Customer Economy is a global force, and companies with operations around the world are using CRM for competitive advantage. In its own global expansion, E.piphany has uncovered that each global market has a different business requirement, and these different regions are approaching CRM in a variety of ways. In this session you will learn how to globalize your CRM efforts, what the leading customer-centric business requirements in major global markets are, and hear remarkable success stories about leading global companies.



EDS, the leading pure-play global services company, provides strategy, implementation and hosting for clients managing the complexities of the digital economy. We bring together the world's best technologies to address our clients' critical business imperatives. We help clients eliminate boundaries, collaborate in new ways, establish their customers' trust and continuously seek improvement. In fact, everything we do helps enterprises win in the digital economy. We serve the world's leading companies and governments in about 55 countries. Learn more about us at www.eds.com.



Dr. A. Reza Jafari
President of the EDS
Communications,
Entertainment and
Media Global Industry
Group
EDS

Mobility: The Engine that Drives the Digital Economy

For more than a year, we've been hearing about "mobile" communications — the ability to stay connected anytime, anywhere and any way. Yet, amidst the hype and confusing claims, many are missing the opportunity to fully harness the power of mobility. Dr. Reza Jafari will discuss what it takes to succeed in the digital economy through full-fledged mobility. He will cover the value of a viable business value chain and the importance of scope and scale in meeting the needs of businesses and customers alike. Through a discussion of real-life examples, session participants will learn how to achieve digital freedom through a spectrum of capabilities using wireless and wireline transmission — at work, home and play.



HEWLETT-PACKARD COMPANY — a leading global provider of computing and imaging solutions and services — is focused on making technology and its benefits accessible to individuals and businesses through simple appliances, useful e-services and an Internet infrastructure that's always on. HP has 88,500 employees worldwide and had total revenue from continuing operations of \$48.8 billion in its 2000 fiscal year. Information about HP and its products can be found on the World Wide Web at www.hp.com.



Rich Raimondi
Vice President and
General Manager,
E-services.Solutions
Hewlett-Packard
Company

How to Capitalize on E-Services

E-services are the next big Internet wave. Quickly growing in popularity, these services consist of software, computing resources, information, business processes, and any other asset that a company can digitize and deliver over the Internet. Raimondi will discuss how forward-thinking companies are capitalizing on e-services to quickly generate new revenue streams and lower costs. He'll explain how the spread of mobile information appliances is creating a lucrative market for mobile e-services. Raimondi will also consider the role that partner ecosystems play in e-services and will discuss the importance of an always-on infrastructure to deliver those e-services.

Information Builders

INFORMATION BUILDERS helps leading organizations, including 92 of the Fortune 100, drive operations and maximize opportunities through the power of information. We provide the only comprehensive business intelligence software solutions with built-in access to any data and the ability to handle all enterprise reporting requirements, including portals, OLAP, ad hoc, and information broadcasting. Our solutions enable organizations to transform themselves to e-businesses more quickly and cost-effectively by integrating core business systems and data, including legacy and ERP, with new technologies such as wireless and XML, for the rapid development of B2B, B2C, CRM, and intranet systems. For more information, visit us at www.informationbuilders.com.



Michael Corcoran
Vice President of
Marketing
Information Builders

i-Business Intelligence: Today's Strategic Weapon

e-Business is a given. i-Business is the challenge. Most organizations spend billions collecting data, only to use less than 7%. Market leaders will be those that move closest to 100%. The business of the future acts quickly, anticipating change and improving business processes. With i-Business, you can not only automate business processes, you can improve them. How much more intelligent can you make your business processes? How much more insight can you give your managers and employees into the business so they can take effective action? How much more integrated can you make your supply chain and enterprise? How much more interactive can you be with your customers? Hear how leading organizations are dealing with these challenges by providing information to their managers, partners, customers — including mobile users.



For over three decades, **INTEL CORPORATION** has developed technology enabling the computer and Internet revolution that has changed the world. Intel is at the forefront as a primary building block supplier for the Internet economy. Today, companies incorporate Intel architecture-based solutions across their connected business and IT environments to create successful e-Business infrastructures: from Internet servers to data center systems, desktops to workstations, and laptops to network PCs and online services. For more information on Intel and its role in e-Business, visit us on the web at www.intel.com/ebusiness.



Carol Lee Cobb
eMarketing Strategist
Intel Corporation

The Critical Challenge of Customer Service

With the Internet driving an increased demand for personalized service, instant information and collaboration, customer service has become a critical challenge in the Internet economy. However, customer service is often not given the same high priority as other mission-critical business issues. But how do you implement a customer-centric e-business solution in this demanding environment? What is possible with today's technologies? We'll explore three real-world case studies that illustrate how e-business companies and customers are implementing customer-centric solutions to solve real business problems today. A proof-of-concept prototype of a customer-centric e-business solution will be shown and distributed to each participant.



INTEL ONLINE SERVICES provides global web services that manage the complexities of e-Business computing. We focus on delivering a better overall customer experience by combining integrated technologies and proven processes to provide services with built-in reliability, scalability and optimal performance. We offer a broad spectrum of services, including managed web hosting, database hosting, application hosting, caching and streaming media, backup and recovery, scalable data storage, and global service delivery and load balancing. Visit www.intelonlineservices.com.

Renee James
World Wide Director of
Marketing and Customer Services
Intel Online Services

An Integrated Approach to Outsourcing e-Business

The Internet is now reaching out to every corner of the planet touching billions of people and businesses, and maturing at an incredibly rapid pace. The Internet's many facets — network infrastructure, ISPs, ASPs, hosting, servers, clients and services—are beginning to move toward specialization as various companies develop areas of core competency in specific service segments. With this development comes new challenges and new opportunities. Intel® Online Services provides global web services that manage the complexities of e-Business computing. We focus on delivering a better overall customer experience by combining integrated technologies and proven processes to provide services with built-in reliability, scalability and optimal performance. By offering outsourced e-Business solutions using best-in-class applications, we fill the void left by the specialization trend in the market.



KINTANA: Powering Business Transformation with Technology Chain Automation. Kintana provides an enterprise application bringing speed and control to business initiatives and technology operations. More than 200 leading companies use Technology Chain Automation from Kintana to automate business and technology processes, gain real-time visibility and control of IT initiatives and leverage their technology investments. The results? In a few weeks, tenfold speed and productivity gains in IT. Please visit www.kintana.com or see us at *CIO Perspectives*.



Andy Starr
Director of Information
Technology
Cisco
Courtesy of Kintana

Cisco's Approach to Business Transformation; Powering the Cisco Connection Online with Kintana

Ninety percent of Cisco orders are processed through a critical e-commerce application called Cisco Connection Online. It brings together 400 content developers, 700,000 data files, and 175 applications to generate \$55 million in revenue every day. Managing CCO is an enormous challenge. Gaining visibility and control over the site's ongoing initiatives and operations is key to success. Cisco worked with Kintana, creators of technology chain automation, to achieve secure, systemized processes, self-service reviews and approvals, and automated deployment of new site features. This has allowed Cisco to reduce the size of the site's management team by 25 percent, even while revenues through CCO have quadrupled. Starr tells how Cisco transformed one of the world's largest e-commerce sites.



LEGATO SYSTEMS, INC. (NASDAQ: LGTO), is a worldwide leader in enterprise storage management. Helping companies leverage business-critical, corporate data assets, Legato's products and services enable information continuance, a seamless approach to the movement, management and protection of data throughout an enterprise. Founded in 1988, Legato serves *Fortune* 1000 companies and has become the recognized industry standard for storage management software products, currently shipping to 30 of the 50 *Fortune* e-50 top businesses. Legato is a founding member of the Storage Networking Industry Association.



George Symons
Vice President, Product Development
Legato Systems

Information Availability Requirements for the Enterprise Service Provider

This talk discusses the transition enterprise IT organizations are going through to deliver on service level objectives. These IT organizations are feeling pressure from internal customers to commit to service level objectives in the same way that service providers are beginning to do. In addition, market trends and the challenges of a multiple platform open systems environment and the complexities it brings are discussed. Finally, a set of criteria is presented, including short-term and long-term strategies, along with product functionality so companies can meet service level objectives easier.



NetScout
Because the network is the business.™

NETSCOUT SYSTEMS, INC. is the leading provider of infrastructure performance management solutions for leading companies and service providers worldwide. Headquartered in Westford, Massachusetts, NetScout serves approximately half of the *Fortune* 500 with offices in North America, Europe and Asia. NetScout's flagship solution is the nGenius™ Performance Management System, a suite of network management software and hardware products that optimize the performance of the network and its ability to deliver applications and content to end-users. For more information on NetScout go to www.netscout.com



Bruce Kelley
Vice President Engineering
NetScout Systems, Inc.

The Top Five Secrets of Making Your Network Infrastructure Investment Pay

Why is network management suddenly so HOT? With the Internet a widespread means of conducting business, the performance of the network infrastructure is now top of everyone's mind. In fact, recent studies indicate that networking infrastructures now rank among the top expenditures for any leading business. However, the challenge of deriving value from this spending remains huge. How do you maximize the performance of this complex network environment while delivering greater returns on your investment? In this session, Kelley will address the top issues facing CIOs today in managing their e-business networks. He will discuss the pros and cons of instrumenting a network, how to use key business metrics that measure overall performance, and how to tap into valuable network data sources that can lower total cost of ownership.



PROSIGHT combines a suite of IT management applications and services with just-in-time information to enable IT executives to effectively choose and execute an IT investment strategy that increases the value to the businesses they serve. ProSight's software allows IT managers to automate key IT processes such as portfolio management and life cycle management. At the same time, ProSight's applications are communicating critical real-time measures of IT performance and integrating practical knowledge to support timely decisions. All of this puts the CIO and senior IT team in control of the resources under their command. Learn more about ProSight by visiting www.prosight.com.



John Cimral
CEO
ProSight Inc.

Eric Nagel
Senior Vice President,
Domestic Operations
ALLTEL Information Services

In Search of Ariadne's Thread: How One Information Services Company's Unique Implementation of IT Management Software Enabled Effective Client Health Assessment

Similar to Theseus following the golden thread left by Ariadne to lead him out of the labyrinth, companies today are searching for that "golden thread" to lead them through the labyrinth to effective assessment of their service level to their customers. ALLTEL Information Services (Telecom Division) implemented ProSight's IT Management application to automate IT performance management and enabled them to dynamically assess the "health" of each of their many clients. This ability has allowed ALLTEL to lower the cost of service assessment, proactively respond to "health" issues in a quicker fashion, and provide insight into service dimensions previously unseen.

corporate hosts and

ServiceWare

SERVICEWARE is a leading provider of Web-based solutions for enterprise service and support, which enable organizations to win on service in the competitive world of eBusiness. ServiceWare delivers a comprehensive, integrated family of eService solutions that enable organizations to easily provide customers with fast, accurate answers to inquiries via Web, e-mail, phone, fax or in-person. Based on ServiceWare's robust knowledge base and patented Cognitive Processor™, ServiceWare's eService Suite™ enables customers to build service destinations for eBusiness.



Mark Tapling
President & CEO
ServiceWare

The New Definition of Customer Service

As use of the Internet expands, so does customer service delivery. Successful companies must expand their vision of customer service by not only applying intervention to address broken business processes, but by providing customers with the tools they need to be self-sufficient, and facilitate the speed of collaborative business. Concurrently, low switching costs and fleeting customer loyalty require that companies broaden their definition of the "customer" to include everyone that affects their business — employees, partners and shareholders. This presentation offers Tapling as an expert on the changing definition of customer service today while raising the question: what will customer service look like in 2010?



Founded in October 1999, **SITESMITH** is the leading provider of comprehensive Internet infrastructure managed services. The company develops and manages large-scale, complex Internet sites for Global 2000 companies to ensure performance, reliability, security and scalability. Providing a complete and flexible Internet infrastructure solution, SiteSmith Operations Platform automates the critical elements of site management including security, 24x7 monitoring, network redundancy and backup. The company has its U.S. Headquarters in Santa Clara, CA and its European Headquarters in London. Information about SiteSmith's services and world-wide office locations are available on the World Wide Web at www.sitesmith.com



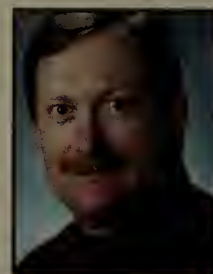
Treb Ryan
Founder
SiteSmith, Inc.

The Promise of Managed Services

Does the management and architecture of your Web site give you a business advantage over your competition? In choosing where to host, what technologies to run and which MSP to handle the delicacies of your site, you are deciding your online fate. Ryan will explore the different offerings in the managed service space, and try to answer some of the questions you're facing: Is a co-location facility equipped to handle the 24x7 management needs of a Global 2000 Web site? Why do the various MSPs bring such differing perspectives about how to architect, manage and scale a site? And, are the co-location providers and MSPs fulfilling the promises they make to their clients? As we explore these questions, it will become evident that the promise of monitoring, high availability, site architecture, an operating platform, security and backup can have vastly different connotations — and a real impact on business advantage.



TRIPWIRE, INC. is the leading provider of data and network integrity solutions for Global 3000 companies and e-business corporations as well as key public sector organizations. Tripwire enterprise software provides the foundation upon which security, network management and risk management strategies are built. It ensures that organizations can be confident in the integrity of all "data at rest" in their network (source, destination, and all stops in between.) Tripwire customers include Intuit, AT&T, Ernst & Young and the U.S. House of Representatives. Tripwire is headquartered in Portland, Oregon with offices in Silicon Valley, CA, and 15 countries around the world. For more information about Tripwire, please visit our Web site at www.tripwire.com.



Charles Kolodgy
Research Manager
International Data
Corporation (IDC):
Internet Security
Program

Prashant Dubey

Vice President
Marketing & Business Development
Tripwire, Inc.

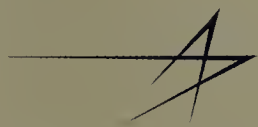
How CIOs Can Invoke Trust in IT: Data and Network Integrity

Cyber terrorism and hacker attacks have been a subject of media hype, and grand IT compromises have been highlighted for all in the industry to see. An IT infrastructure that does not have integrity can result in economic loss or even loss of market perception that can be a "bet the company" situation. In this session Kolodgy will describe the "state of the state" of Information Security and talk about progress made, challenges ahead and CIO strategies to overcome them. In addition he will discuss the concept of Data and Network Integrity (DNI) and how it is a foundation for an information security, network management and risk management strategy.

*The following Corporate Hosts
will also be joining CIO in Boca Raton.*



INTIRA CORPORATION is a leading e-business infrastructure outsourcing provider. Intira Netsourcing Solutions power mission-critical e-business applications with maximum availability by providing a seamlessly integrated IT/network infrastructure; highly automated, secure operations; a broad set of highly skilled technical resources; and a full range of robust, value-added services. Intira Netsourcing Solutions enable e-businesses to remain focused on their core business competencies — not the complex technology running their e-business applications. Visit Intira at www.intira.com.



LOCKHEED MARTIN

LOCKHEED MARTIN Global Telecommunications is a premier global source of network services and advanced infocom solutions to enterprise customers. A wholly owned subsidiary of the Corporation, LMGT is focused on offering one-stop solutions for integrated, managed, secure, Web-based enterprise IT and telecommunications services via a broad portfolio of network, application and IT services.



KYOCERA MITA AMERICA, INC., is a leader in digital document imaging. As part of the \$7.5 billion Kyocera Corporation, KMA is known for developing economical, ecologically sound print engines, state of the art controllers and network tools plus years of innovation in copier technologies, paper handling and manufacturing experience. The product line includes network ready computer connectable digital printers, printer/copiers, color printer/copiers, multifunctional and wide format imaging solutions. For more information, visit www.kyoceramita.com.



symantec™

SYMANTEC, a world leader in Internet security technology, provides a broad range of content and network security solutions to individuals and enterprises. The company is a leading provider of virus protection, risk management, Internet content and e-mail filtering, remote management and mobile code detection technologies. Headquartered in Cupertino, CA, Symantec has worldwide operations in more than 33 countries.

Companion Program

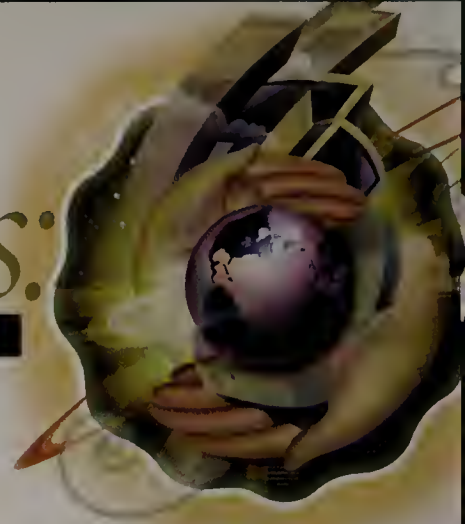
The companion program allows companions to join conference participants during designated meals and social activities at the CIO Perspectives conference and meet other companions for special activities. Plan your vacation with us in sunny Florida and enjoy brunch on the beach, a unique fitness class, and a complimentary shopping shuttle to exciting Mizner Park. Can you picture yourself as a culinary whiz? Participate in a special lunch that is hands on and led by one of Boca Raton Resort & Club's award winning chefs. If you can find any time left over from planned activities, visit the resort's luxurious health and fitness center where you can enjoy a relaxing spa treatment or indulge in one of the many watersports offered.





Without Boundaries:

THE CIO IN THE NEW WORLD



APRIL 22 - 24, 2001

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WHAT IS YOUR INDUSTRY?

WHAT ARE YOUR ORGANIZATION'S ANNUAL REVENUES OR ASSETS?

WHAT IS YOUR ANNUAL IT BUDGET?

YOUR NAME AS YOU WANT IT TO APPEAR ON YOUR BADGE

NAME OF COMPANION (IF PARTICIPATING IN COMPANION PROGRAM)

HOTEL ACCOMMODATIONS

We urge you to make your reservations early by calling the hotel at 561-447-3000 and identifying yourself as part of the CIO conference to receive the conference rate. **CIO will make hotel reservations for government/military participants only.** Be sure to guarantee your room with a credit card, as all unreserved or unguaranteed rooms will be released on March 23, 2001. Hotel reservations, cancellations and charges are your responsibility. If a CIO conference Enrollment Form is not received within 48 hours of making your hotel reservation, your room will be released from the CIO room block.

ENROLLMENT FEES

All enrollment fees must be paid in advance of the meeting. Fee includes conference sessions, business briefings, Corporate Host displays, conference materials and scheduled meals, receptions and entertainment. Transportation, hotel and recreation are your responsibility. **Please note that submission of this enrollment form to CIO obligates the attendee/sender for the enrollment fee.**

CANCELLATION

All cancellations or substitutions must be made in writing. You may cancel your conference or companion enrollment up to March 23, 2001 without penalty. A \$300 administration fee will be imposed for cancellations between March 24 - April 6, 2001. **No refund or credit will be given for cancellations after April 6, 2001 or for no shows.** You may send a substitute in your place. CIO reserves the right to decline enrollment to any registrant.

If this is your first CIO conference, your business card is required to process your registration.

CHECK ALL THAT APPLY:

ENROLLMENT FEES:

☐ **IT PRACTITIONER/EXECUTIVE = \$2,480**

This fee applies if you are a CIO, IS executive or hold another executive position other than those listed below.

☐ **GOVERNMENT/MILITARY = \$2,900**

This fee includes your hotel for three nights. Do not make your hotel reservations, CIO will make them for you.

Arrival Date _____ Departure date _____

☐ **SALES/MARKETING/CONSULTING = \$10,000**

This fee applies if you hold a sales, marketing, new business development or consulting position, including executive management of IT vendor and consulting companies. This fee is payable by **company check only**. CIO will make the final determination of this category.

☐ **COMPANION PROGRAM = \$350**

Companions must be enrolled in this program to attend any conference-related functions including all scheduled meals, receptions, entertainment, companion breakfast, and planned companion activities. Conference session attendance is **not** included.

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offers speeds of no more than 1.5Mbps. The only options generally have been a fractional T1 or a multiple T1 at correspondingly lower and higher monthly tariffs—in other words, not much in the way of alternatives.

Seeking to fill the need for options, several challengers have appeared recently. DSL was supposed to offer T1 speeds at a much lower price, but real-world implementations seldom matched T1 performance. And when they did deliver the speed, their prices were apt to be equally elevated. In any event, DSL services as a whole have yet to demonstrate enterprise-class reliability and, moreover, the services have been

New York City, Terabeam in Seattle, New York City-based Winstar and San Francisco-based Yipes, just to name a few.

While none of these upstarts share identical service offerings or business plans, all place their emphasis on high-speed data as opposed to voice—hence the name, data-centric local exchanges. But that's far from all they do. Quite a number, including OnSite Access, Winstar and Yipes Communications, offer voice as well—generally in a bundle combining local and long-distance calls with high-speed Internet access and LAN extension. Some of the companies provide Web and application hosting. A number, including ARC,

DSL was supposed to offer T1 speeds at a much lower price, but real-world implementations seldom matched T1 performance.

plagued with well-publicized security lapses as well as disquieting business failures among the providers. Other high-speed access technologies—such as broadband wireless, cable data, two-way satellite and fiber to the building—either haven't happened yet or at least haven't been available in the bulk of business districts.

Dawn of the D-LECs

Then, with little advance publicity, a host of new companies called variously data-centric local exchanges (D-LECS) and building local exchanges (B-LECs), derived from the fact that many of these companies bring their services to multiple companies in a building, began to challenge the incumbents with services that offered throughputs in the tens or even hundreds of megabits per second at prices in the hundreds or low thousands of dollars per month. The list of insurgents is long: Dallas-based Allied Riser Communications (ARC), Cogent Communications in Washington, D.C., OnSite Access in

even sell LAN consulting services.

Diverging service offerings aside, all of the companies resemble one another not only in their data-centric points of view, but in providing impressive speeds at cut-throat prices. Plus they each seek to offer very fast time to service, thus attacking the two biggest perceived weaknesses of the incumbent providers—high cost and long delays for implementation.

Happy Customers

Of these two key attributes, the cost-performance ratio is probably the more attractive to most subscribers. Santa Clara, Calif.-based voice-over-IP system provider TollBridge Technologies, another Silicon Valley early adopter of the Yipes service, reports a similar experience. "We couldn't believe the price," says Agnes Imregh, former vice president of marketing. "We jumped at it, and so far it's been great."

Speedy arrival times have also won over a number of the initial subscribers to these new services. Denis Kavanagh, chief oper-

new products

Palm Basic

AppForge recently released a development environment that allows programmers to write Microsoft Visual Basic (VB) applications that can run on Palm personal digital assistants. AppForge integrates into VB 6.0's development interface, letting developers continue to work in a familiar environment. A small run-time application called **Booster** then lets the VB applications operate on a PDA. AppForge programs can work on devices with at least 2MB of RAM running Palm OS 3.1, including the Palm III, Palm V and Palm VII. Pricing begins at \$695. For more information, visit www.appforge.com or call 678 686-9000.

Python Tamer

Python programmers have a new tool for their kits. **TheKompany.com** has announced the release of **BlackAdder**, an open-source graphical development environment for both Windows and Linux that can help speed creation of applications. BlackAdder includes debugging, syntax highlighting, open database connectivity interfaces and HTML documentation. Applications generated with BlackAdder will run on either Windows or Linux. Pricing begins at \$399.99 for a business license, with an additional cost of \$299.99 per year for software updates. For more information, visit www.thekompany.com or call 949 713-3276.



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ations officer for David Lawrence & Associates, a New York City-based executive search company, was impressed: "We needed a second T1 line, and AT&T told us [it would take] another 60 days after they'd already strung us along for several weeks. OnSite Access said four weeks, and they met their deadline."

Matthew Kesner, CIO for the law firm Fenwick & West in Palo Alto, Calif., was

D-LEC/B-LEC phenomenon. "They're leasing dark fiber [fiber-optic cable that doesn't have communications equipment attached to it]—in many cases, from Metromedia Fiber Network [in White Plains, N.Y.]—and they're setting up the networks as large gigabit Ethernet LANs." The gigabit Ethernet equipment is far less expensive than the infrastructure for a synchronous optical network (SONET) or asynchronous

Ultimately, the biggest factor determining the fate of the D-LECs may not be the strength of their respective technologies but the reactions of the well-entrenched and well-financed incumbents.

similarly happy with the speed of provisioning displayed by Yipes. "They offered to get us any increment of 10 megabits within 10 days of our placing the order. And they delivered," he says.

Such enthusiastic customers aren't alone, and practically all of the larger D-LECs and B-LECs have been accruing new accounts and territories at a dizzying pace (though they still make up only a tiny fraction of the overall market for high-speed business access). This leads to a logical question: How can they price their broadband services so far below those of the incumbents? And how are they likely to fare once the incumbents become aroused and when multiple D-LECs begin to compete in the same market spaces?

Guerrilla Access Strategies

"Most of the new companies in this space pursue broadly similar strategies," observes Kevin Mitchell, directing analyst for service provider networks at San Jose-based Infonetics Research and an authority on the

transfer mode (ATM) networks, giving these companies a way to undersell the incumbents.

"Personally, I think the business plan is very sound because it is in harmony with long-term trends in network evolution," Mitchell says. His view of network evolution encompasses simplified design and administration, easier implementation and more flexible service offerings.

Gigabit Ethernet at the core and pure IP traffic over the network also simplify network connections for the enterprise user, because they permit a direct termination at an Internet port at the enterprise's own switch or router. And that certainly works for Mark Dunic, manager of network systems and telecommunications at Swarthmore College in Swarthmore, Pa., and an enthusiastic user of the Yipes service: "The pure Ethernet transport is ideal with us because we're linked up with the networks at Bryn Mawr and Haverford, which have fast Ethernets as well."

On the other hand, the questions surrounding a gigabit Ethernet architecture

new products

Note Taker

The **TransNote**, IBM's latest ThinkPad, combines digital power with pen-and-paper ease. The system includes a subnotebook-size computer that attaches to a pad of paper. Users can type in data on the system's keyboard, enter it via the computer's touch-screen or simply write it on the pad of paper. Sensors under the pad transmit the notations directly to the computer, where they can be saved as images or translated to text. Retail pricing has yet to be set. For more information, visit www.ibm.com or call 800 426-4968.

Where They're At

RealMapping offers software that can identify the origin of visiting Web browsers by their IP address, allowing customers to transmit customized pages to the viewer that account for local languages or product offerings. The company has previously released products that identify browsers by language, country and educational institution. Now it has unveiled **RealMapping City**, which can pinpoint the metropolitan area or area code of visitors in Canada, Germany, the Netherlands, United Kingdom and United States—with more countries slated for later release. Pricing for the product had not been set at press time. For more information, visit www.realmapping.com or call 646 452-8201.



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may make some IT managers hesitate. "You don't have the proven subsecond restoration capabilities of SONET or real carrier class equipment," notes Mitchell. And both AirFiber, a San Diego-based manufacturer of free-air laser infrastructure equipment, and North Andover, Mass.-based Quantum Bridge, which makes low-priced passive optical systems, espouse ATM.

Beam It Up

This all assumes, of course, that the network is Ethernet-based. In the relatively small number of D-LECs using wireless access technologies, the carrier standard ATM is just as likely to be used. Winstar uses ATM-based microwave equipment, while Tellaire, a Dallas-based startup using free-air laser beams to connect its network, also uses an ATM core. AirFiber, a San Diego-based manufacturer of free-air laser infrastructure equipment also espouses ATM.

In each of these cases the higher cost of ATM switching equipment is purportedly offset by the lower cost of the physical medium for the network—air. But once again, reliability questions inevitably arise.

While some wireless providers, including Winstar, claim five-nines reliability, analysts in the field note that current generation local multipoint distribution services equipment in the field hasn't been around long enough to make such assertions entirely convincing. And the free-air laser systems are apt to inspire even more grave doubts because the equipment has gained a reputation, openly admitted by most manufacturers, for link failure in the presence of heavy fog. However, at least a couple of the newer manufacturers including Richmond, Canada-based fSona Communications and Terabeam, which, incidentally, is also a carrier, are touting new laser technology that supposedly reduces the weather dependency of the systems.

Ultimately, however, the biggest factor determining the fate of the D-LECs may not be the strength of their respective technolo-

gies but the reactions of the well-entrenched and well-financed incumbents. At the moment, most of these competitors are simply watching and waiting, though several long-distance capacity suppliers such as Level 3 Communications, in Broomfield, Colo., and Denver-based Qwest Communications are reportedly contemplating D-LEC-like services of their own. "The RBOCs [regional Bell operating companies] will wait this out for a while, and when it's taken enough of their T1 business, they'll get into it themselves just like they did with

DSL once it proved to be a real market. And once the pioneers start failing, companies like Yipes may not be sustainable in the long run," says Solomon Wong, executive vice president of Ottawa-based Akara, a manufacturer of optical equipment for the metro space and supplier to both the incumbents and D-LECs. "We'll just have to see." ■

Dan Sweeney is a technology writer based in Burbank, Calif. He can be reached at dswee34359@aol.com.

PREDICTIONS

e-commerce

Net Markets Mature

ONLINE EXCHANGES, Net marketplaces—call them what you will; the B2B bubble has popped. But while some companies have evaporated in the aftermath, others are in the process of trying to change into something different—something successful—according to a recent report by New York City-based analyst company Jupiter Communications.

The report, "Net Markets: Matching Business Objectives with Infrastructure Investments" (September 2000), describes how companies involved in such initiatives must migrate from older B2B models. In particular, says report author and Senior Analyst Mary Cicalese, the new markets must stop insisting that suppliers and buyers change their business models in order to use the online services.

Instead, she notes, the new Net marketplace must make a dedicated effort to integrate with existing processes. "It's a mandate that [Net marketplace providers] take a look at their industry and their business, and not try to force people to change for technology's sake," she says.

The study also notes that next-generation Net markets will incorporate a wider variety of collaboration tools, allowing buyers and suppliers to work more closely, as well as analytical tools that will help parties identify weak links in their supply chains.

—Christopher Lindquist



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REVISIT multimedia

Sights and Sounds

From CD-ROM to the Web, multimedia thrives BY FRED HAPGOOD

IF THERE WERE a law of technology management it might be this: Every technological advance contains a step backward somewhere under the surface. A person choosing cars over horses, for instance, gains speed but loses the option of napping in transit. E-mail gives you quicker access to others (good) at the cost of giving others quicker access to you (not so good). An average CIO just accepts the features in the brochure; a superior one systematically searches for what will be lost, because she knows that something always disappears.

Consider for example what the Internet brought to multimedia. Since the early '80s, information culture came in two faces: computers and television. Television was rich with colored images, motion and sound, while computer displays were monochromatic, text-based, relatively static and, if you didn't count the scraping of disk drives, silent.

But in technology, wherever there is a

wall, someone will try to dynamite it. And with the invention of the digital CD-ROM and its then awe-inspiring storage capacity, those forces acquired a promising tool. Toward the end of the '80s a new group of vendors appeared, selling software that promised to enrich text with graphics, animation, speech and music, thereby transforming it into multimedia.

On Nov. 1, 1992, we gave the technology a look and came away with a split decision: Some large companies had indeed found useful niches for the technology. Caterpillar, the manufacturer of construction and mining equipment in Peoria, Ill., was using CD-ROMs to store the images for sales materials. American Airlines used the discs to reduce redundancy in maintenance inventory by helping mechanics find and retrieve rarely used tools.

However, it was clear that industry penetration was pretty shallow, and we gave lots of space to the reasons: insufficient

new products

Instant Intranet

XESystems has announced the release of **Intranet Docs 3.0**. The document storage solution prevents users from having to send cumbersome technical documents through e-mail. Instead, users retrieve files from a Microsoft SQL Server database, after which they can view and print the files from anywhere on the network through a standard Web browser. For collaboration purposes, users can zoom in on a piece of a document, add comments and then send a URL to other users so they can quickly go to the exact location. The product is available in a variety of configurations, ranging from 15,000-document starter packs to fully configured hardware and software bundles. Call 877 937-8212 ext. 751 for pricing, or for more information, visit www.xes.com.

XML Goes Mainframe

Merging IBM's CICS application server into e-commerce may not be easy, but now companies looking to make the move have another option. **HostBridge Technology** has announced **HostBridge**, a software product that lets users retrieve XML-formatted output directly from CICS transactions via an HTTP request instead of "screen scraping" data from a terminal screen. The product is compatible with a variety of application servers,



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bandwidth, poor standardization, high production and distribution costs, and imponderable questions about the value of all this sizzle. Plus there didn't seem to be a killer app that spoke to industry as a whole and could drive adoption, investment, innovation and standardization.

In retrospect we may have been a bit too conservative. Multimedia really did have a killer app; however, it lay just beyond our vision at the time. During the next few years, the unrelenting demands of computer gamers forced hardware and

rhythms and infrastructure, developers have made a great deal of progress in finding clever ways of streaming multimedia objects to users before they need them, thus restoring the speed and predictability inherent in local desktop devices such as CD-ROM drives. Online slideshow presentations have emerged as the natural implementation of this technique, since the sequence of pauses inherent in this medium allows plenty of time for background downloading.

This general idea—storing multimedia objects ahead of time and as close as pos-

Toward the end of the '80s a new group of vendors appeared, selling software that promised to enrich text with graphics, animation, speech and music, thereby transforming it into multimedia.

software vendors to beat multimedia tools into something even businesspeople could use. By the middle of the decade, advertising and media companies were routinely using the technology to demo their services and for corporate promotion.

Then the Web fell out of the sky, changing everything. Servers replaced CD-ROMs, and networked delivery displaced disk distribution. Open standards such as HTML and HTTP spread overnight. Huge new constituencies flocked to the medium.

But companies paid for these gains with a huge step backward in available bandwidth and synchronization. Because Internet bandwidth was so much narrower and delivery less predictable than that supplied by desktop circuitry, the scope of opportunity for Net-based multimedia shrank drastically. For years the design vocabulary of Net media has been restricted to small graphics, jerky sound, very short animations and video images so crude they are barely viewable.

This loss is well on the way to repair. Aside from advances in compression algo-

sible to the user's computer—is even being pushed into the architecture of the network. The effort is being led both by general-purpose caching companies like Akamai Technologies in Cambridge, Mass., and Digital Island in San Francisco, and a wave of newer vendors that specialize in multimedia caching. (InfoLibria of Waltham, Mass., is an example of the latter, which focuses on video delivery.)

If all of these trends continue—higher bandwidth, better compression, more clever caching in both hardware and software—we might once again have the option of integrating the full multimedia vocabulary into all of our communications. Maybe in a few years the smart CIO will be looking for the downsides of e-mail in stereo 3-D with quadraphonic sound, high-definition video and interactive animations. I can think of a couple of possibilities right now. ■

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UNDER DEVELOPMENT

tele-immersion



Almost Like Being There

THE NATIONAL Tele-Immersion Initiative's virtual reality project isn't quite as good as *Star Trek: The Next Generation's* Holodeck virtual reality environment, but who's quibbling?

Last May, using an ultra-broadband Internet2 pipe (100Mbps), researchers at the University of North Carolina at Chapel Hill, the University of Pennsylvania in Philadelphia and Advanced Network & Services in Armonk, N.Y., linked themselves together in a tele-immersion conference. The experiment let users view life-size, three-dimensional images of each other and their surroundings.

The project's goal is to make remote conferences more closely resemble real-life meetings. To this end, users sit in front of a pair of screens set at a right angle and view projected images of fellow participants. High-resolution 3-D images, refreshed three times per second, make people and objects appear to leap from the screen, says Greg Welch, a research assistant professor in the computer science department of the University of North Carolina at Chapel Hill. "It's almost like being there," he adds. "Lean forward and the person gets larger. Recline and everything gets smaller. Move

your head and the scene shifts slightly."

But putting together a tele-immersion conference isn't as easy as hooking a webcam to a PC. The technology requires users to wear uncomfortable stereo glasses and a cumbersome "head tracker." Less annoying, but also necessary, is an array of seven video cameras (on average) that captures distance and color information within each participant's environment. There's also that bandwidth problem. Welch admits that high-quality tele-immersion could require network speeds in the 1Gbps neighborhood (though the exact requirement isn't yet certain).

Still, despite tele-immersion's current shortcomings, Welch believes that the technology could eventually find a business niche as bandwidth costs tumble and processor speeds soar. Although conventional videoconferencing has yet to seriously challenge the need for costly business travel, Welch feels that a realistic, high-resolution system that allows users to closely examine documents, objects and even facial expressions would provide a suitable forum for natural interaction. "Medicine, engineering and architecture are just a few of the professions that could benefit from this technology," says Welch.

In the meantime, NTII researchers continue to tweak their system and are looking to add new capabilities, including tools that would improve or even eliminate the technology's bothersome bodywear. Also on the drawing board, Welch notes, is a "haptic" interface that will allow users to touch and feel objects as well as see them. If it works, the difference between teleconferencing and actually being there may become a moot point.

—John Edwards

The experiment let users view life-size, 3-D images of each other and their surroundings in real-time.

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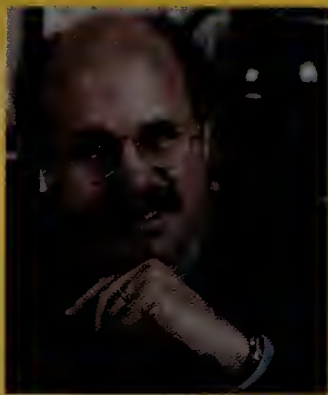
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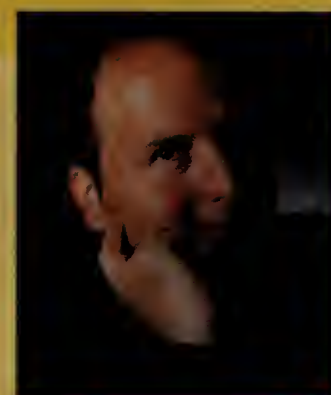
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The 2001 CIO 100 awards will recognize companies that have demonstrated innovation in a number of areas: by creating new products and services that offer potentially significant benefits in the marketplace; by markedly refining, redefining and improving relationships with outside partners or customers; or by creating and refining internal processes that enable them to stay successful in the marketplace or to take the company in a new direction.

The Symposium program explores innovation as the key to future change, growth and success. And who better to moderate our discussions and talk to us about “Innovation in an Age of Creative Destruction” than Paul Saffo, Director of the Institute for the Future? Paul believes that technology doesn’t drive change - it merely enables change. It creates new options and opportunities that we choose to exploit. To him, it is our response to technology that drives innovation and change.

Joining Paul on the main stage will be Geoffrey Moore, Danny Hillis and John Seely Brown. At last year’s Symposium, Geoff shared some of the material that culminated in his book, *Living on the Fault Line*. He returns this year to discuss what lessons he’s learned as a result of his initial engagements with *Fortune* 2000 companies. Danny Hillis,

co-founder of Applied Minds and former Vice President and Disney Fellow of the Walt Disney Company, is uniquely qualified to address “Creativity and Technology.” And nothing less than “The Transformation of Society” is the topic of choice for scientist-artist-philosopher John Seely Brown, Director of the Xerox Palo Alto Research Center.



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Dust off the golf clubs and the tuxedo - you’ll need both (although not at the same time!) to take advantage of the great networking opportunities we offer. Sunday we host a golf tournament at the newly redesigned championship Riverwalk Golf Course. Tuesday’s black tie bash pays tribute to this year’s CIO 100 Award Honorees during a special reception and dinner. Meet more of your fellow participants at Café 100 gatherings

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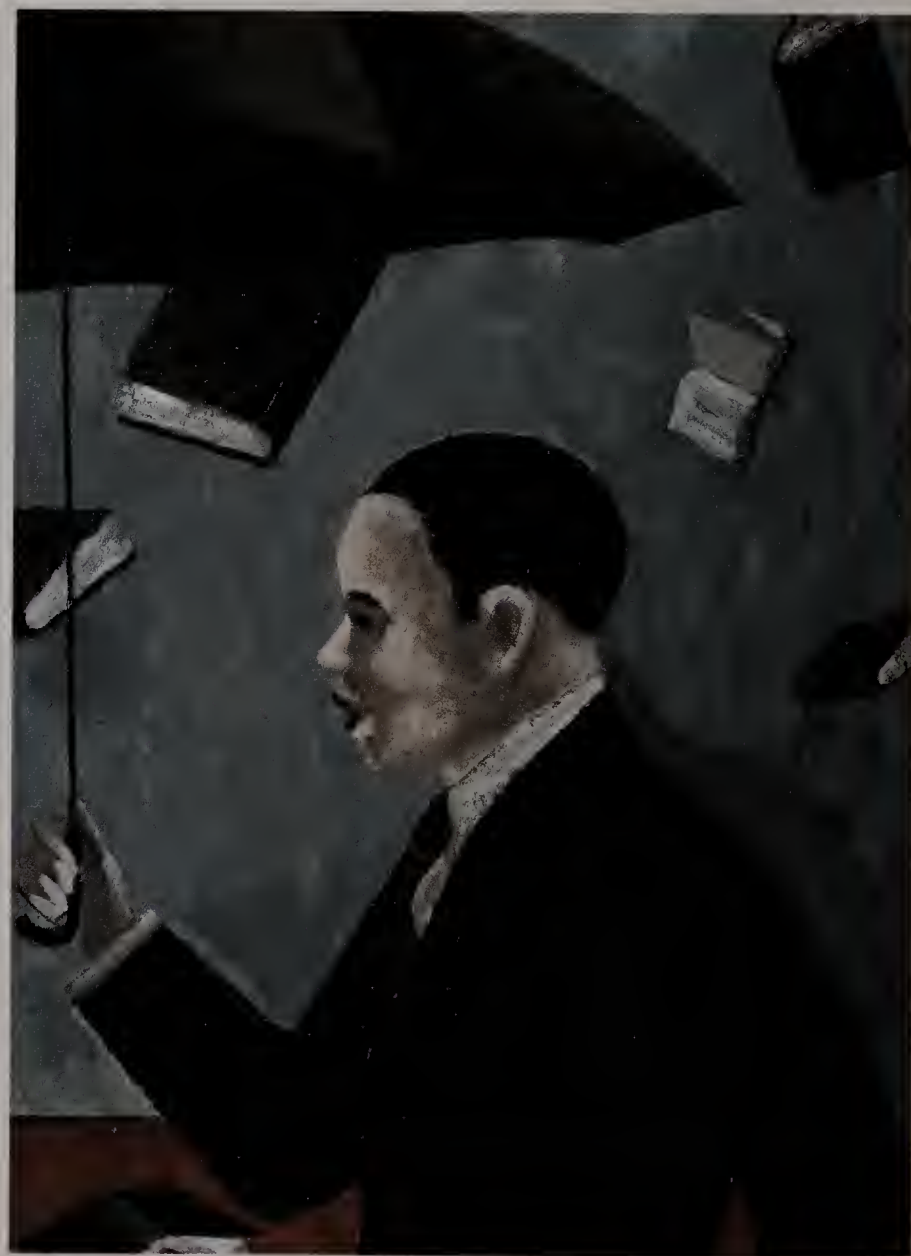
CIO Confidential

Only the Names Have Been Changed

How to Build a Better CIO

IT'S NOT THAT I DON'T have a sense of my own future, it's just that I have a tough time picturing the reality of an individual day if it's more than, say, three months away. If you want to get me to agree to do something I really don't want to do or go someplace I really don't want to go, just ask me six months ahead of time. Six months off seems like a hundred years when your workdays are systematically dissected by highly skilled executive assistants, then carefully reassembled to squeeze the daylights out of every single available minute.

That's how they got me to agree to come here. I'm one in a panel of speakers trapped in one of those cheap, stuffy, windowless hotel meeting rooms half listening to a presentation



that's about as deep as a place mat on the value of a highly structured personal development plan. It's so boring it's making my hair hurt. Glassy-eyed, I daydream that I can hear the scrape and clank of the cogs in my head.

Scattered throughout the dusty and cluttered corners of my poorly tuned brain are millions of worthless tidbits of information that come seeping to the surface unbidden and unwelcome, especially at times like this, with greater clarity and

ILLUSTRATION BY ALAIN PILON



Dear CIO reader:

Paper documents just aren't going away.

Despite the hype of every technology innovation introduced in the past 10 years, our businesses still depend on paper documents. We use it as the medium for all of our important communications --- from mundane invoices and purchase orders to the complex pages of merger and acquisition documents.

But today's business environment dictates speed --- faster information, faster transactions, faster decisions. The Internet has made "tomorrow" too late and "this instant" just in time. How do we weave paper documents into this fast-paced work flow?

On March 20th at 1 p.m. EST, we will be hosting a web cast, "Where paper documents are going." We'll explore how to speed up business communications using two technologies you already have --- your email system and your office copier --- and how merging these two commonly-used office tools can immediately save your organization costs associated with faxing and overnight delivery.

Joining us will be senior executives from Canon USA, the leading supplier of digital office copiers; UPS, the leader in overnight delivery; a global 2500 company leveraging technology to make strides in operating efficiency; and IDC --- the leading technology analyst firm. And, hopefully, you --- a leader in technology innovation at your company.

For more information, please visit www.ecopy.com and click on the web cast icon.

We hope you will be joining us on the 20th.

Best regards,

A handwritten signature in cursive script that reads "Edward Schmid".

Edward Schmid
President
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detail and more easily remembered than my children's birthdays. Somewhere along the way I learned that because of its limited storage capacity, a goldfish's brain can only remember what has happened during the past 30 seconds. If that's true, that means that if the goldfish is hungry, as far as it knows, it's been hungry its whole life. If it's frightened, it's been frightened its whole life. Or happy, or sad, or tired, or confused, or...oh God! I'm bored.

The guy presenting has a voice like a strangled soprano, with the whiny metallic resonance of an electric coffee

more complicated challenges is, as Descartes would say, to doubt what isn't self-evident and reduce every problem to its simplest components. In the face of greater complexity, we are forced to learn more and more about less and less and pursue disciplines that are split into sub-disciplines and sub-sub-disciplines and pared down to pinpoints of expertise. All of the training we get (and give to our people) as we make our way up the corporate ladder is as far from generalist, Renaissance-style learning as you can get, and yet, this mode of study and problem solving is a dominant characteristic of every truly great CIO I have ever known.

Ideas and opinions about business matters such as leadership, creativity, perseverance and integrity can and ought to be gleaned from a place a little closer to the source than our speaker this morning and in a manner that enriches and engages the student on as many levels as possible. A richer source of the material that fills most

office bookshelves can be found in the best of C.S. Lewis and Steinbeck, Vonnegut and Walter Miller Jr., Wells and Verne—writers who may not be among history's greatest thinkers but who effectively restated for their times the best thinking of earlier generations going back to the likes of Democritus, Confucius, Maimonides and Seneca.

About 15 years ago, I got into the habit of sending my direct reports copies of the same book, mostly great popular fiction, to read a month or so before we'd get together for an offsite. The emphasis in selection was that the book had to be at once accessible enough for those whose reading opportunities were limited to airplane rides and what must pass for vacations, relevant enough in theme and message to be considered worth the time, and engaging enough for regular people to actually finish it.

If you haven't ever tried this, I highly recommend it. To get you started, here are a few of my favorites: On the subject of corporate politics and ethics start with *Player Piano* by Kurt Vonnegut. On leadership, I recommend *Cannery Row* by John Steinbeck, especially the chapters involving the frog hunt. On the notion of sacrifice, try *A Canticle for Leibowitz* by Walter M. Miller Jr.

Well, Torquemada has finally finished and sits down to thundering silence. Things are about to go from bad to worse for this audience. I'm the next speaker. **CIO**

What books would you add to Anonymous's reading list? Send your suggestions to confidential@cio.com, and we'll publish the list in a future column. Anonymous has been a CIO at household-name companies for more than 12 years.

It's long past time we set aside all of this tired self-improvement crap and got back to the habit of just learning for its own sake.

grinder. But what he lacks in compelling, relevant content he more than makes up for in attitude. You see, Torquemada here has written a book, one of those overpriced hardcover pamphlets that play to the insecurities of middle managers (desperate to make it to upper middle management) by rehashing someone else's well-described and proven ideas into simpering platitudes and numbered lists: "Twelve ways to maximize the effectiveness of your most self-destructive habits."

There are a few things in life that ought to be avoided at all costs, including prison, user conventions in Buffalo, N.Y., the Ice Capades (unless you're in Buffalo) and books like the one that this clown is plugging. Thousands of books on business techniques ghostwritten for Michael Dell, Bill Gates or Donald Trump, screeds on paradigm shifts and breaking what's not broken by technology gurus, and pop psychology thrillers about this or that most-effective-yet-annoying personality trait sit on every shelf and every credenza in every executive suite in America. These tomes are proudly displayed, often quoted, rarely read, and chock-full of ideas about as original as the Mona Lisa on black velvet. I have at least one of these for every year I've been a manager, sent to me by one boss or another who was deluded enough to think that number one, I'd actually take time to read it and number two, it would do me any good if I did.

It's long past time we set aside all of this tired self-improvement crap and got back to the habit of just learning for its own sake and in the reckless pursuit of its vague possibilities.

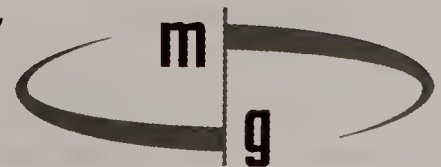
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The Powers That E

BY JEFFREY A. KAPLAN

E-GOVERNMENT IS TOUTED by many as the next great American revolution. Beyond the hype, however, is a growing movement in the United States and other countries to experiment with government-by-Internet. More than 220 countries and territories have websites with links to more than 15,000 government institutions. In the United States, a growing number of federal agencies, states and localities have an Internet presence. There are currently more than 20,000 websites offering government information.

However, the current e-government mantra—focused on digital divides, killer applications and budget savings—misses the more compelling questions: Will e-government transform how government interacts with the populace or serve as a convenience for busy citizens and civil servants? Are we on the threshold of a digital democracy or merely heading toward constant policy-by-polling and 24/7 surveillance by law enforcement agencies?

IT Is Not a Cure-All

High-priced technologies generally add unnecessary costs to otherwise poorly managed organizations. In other words, before you can get e-government right, you need to get e-gov-



ernance right. Poor governance cannot be cured by e-elixirs. Computers and Internet access will not undo corrupt, bloated bureaucracies or ineffective public institutions. Indeed, e-government threatens the political status quo. Political elites and entrenched bureaucrats—particularly in places where government jobs have high profit margins—may resist.

Disturbing scenarios arise when we consider how nondemocratic governments will adopt, or co-opt, information technologies. Such regimes treat control of information as a political bedrock. Access to information is constrained or rationed by those in power. Ultimately, information access is less an issue of too few telephones and computers. Rather, education and a “culture of information” are the foundations for enriching the information-poor and building e-governments.

Consider recent events in China. While President Jiang Zemin lauds the power and promise of IT, new regulations on

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Internet companies prohibit any content that subverts state power or “harms the reputation” of China. Beijing has long blocked direct access to foreign news and politically-oriented websites. Its powerful Ministry of State Security closed websites for posting what it termed “counter-revolutionary content.” At least 20 Chinese cities and provinces are creating special police units to monitor Internet activity. Chinese leaders are girding themselves for the mother of all battles—the control of information. In some respects, they are not far from the truth. China’s IT industry is growing 20 percent annually. That means more computers, more Internet entrepreneurs, more Chinese language websites, more chat rooms, more streamed radio and video broadcasts, more users clamoring for additional information. However, it is difficult to draw a line in the silicon and send troops into TiananmenSquare.com.

As the situation in China demonstrates, absent a willingness to use information in a fundamentally different way, e-government may merely reflect the existing tendencies of institutions, or even facilitate more invasive, centralized control. However, in seeking to construct a Great Firewall to defend against foreign incursions, the Chinese may ultimately be building their own Maginot Line, as ineffective against an electronic blitzkrieg as the legendary French fortifications were against fast-moving German soldiers.

High Stakes

Governments of all political persuasions will feel pressure to adapt. Investors will increasingly factor in the e-government environment—meaning less red tape, more transparent regulations, easier payment of fees—into business decision making. A

country’s or city’s future competitiveness will rest on how it positions itself in the race for investment. Governments, especially in smaller countries and localities that are not prepared to reform, will watch businesses migrate elsewhere, or never invest at all. But online services for businesses will not neatly translate into more participatory governance for citizens. Take Peru, home to Latin America’s first online land registry, and its recent election woes. Cutting-edge e-government initiatives did nothing to prevent President Alberto Fujimori’s use of dirty tricks to remain in power.

None of this diminishes the democratizing potential of e-government. Online government need not simply mean fewer lines or faster permits. A recent poll found that the leading aspiration for e-government among U.S. citizens is to increase government accountability. E-government also offers new avenues for participation in public policy-making. What could be more democratic than that?

There are plenty of caveats to implementing e-government. Digital divides exist within societies. Unraveling the complexities of online government requires sustained political commitment and a measure of techno-literacy among leaders. Privacy and security concerns must be addressed. Yet, the operative issue for e-government is the readiness of governments to democratize access to information. Are they ready to replace command-and-control with click-and-connect? For the moment, the digital divide applies equally to all levels of government. Yet, to the extent that citizen-oriented approaches are adopted, e-government may signal a step toward e-Pluribus Unum. **CIO**

Jeffrey A. Kaplan is an international affairs fellow specializing in e-government at the Council on Foreign Relations in New York City.

The Talent Chase

BY JAMES P. WARE

ATTRACTING AND RETAINING IT talent remains an immensely important and difficult challenge for CIOs. Even though the appeal of dotcoms has slackened in recent months, the shortage of well-educated, experienced IT professionals is still very real. However, recent research by The Concours Group and a number of its clients suggests that attracting and retaining

high-performing staff requires a good deal more than an aggressive recruiting program and a competitive salary structure. In Concours’s experience you must also develop and maintain a high-performance work environment that makes IT professionals want to sign up and stay to contribute to your organization over time.

To develop an organizational climate that motivates and inspires your staff, ask—and answer—these eight critical questions.

1. Do our IT professionals understand our business vision and strategy, and their role in it? Line of sight to the company’s mission is critical in a time when employees have multiple choices not only about where they work but about how much effort they expend in order to help the company be successful. Interest in the company and its mission is influenced far more by your staff’s line of sight to purpose and

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Pirelli	Lloyd's Bank	General Signal	Chubb
Cornell University	Johns-Hopkins Univ.	Barnes & Noble	Gov't of Israel
Giorgio	A.C. Nielsen	Hewlett-Packard	City of Chicago
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high-priced consultants to install the system and train your technicians. You'll be up and running quickly—without any on-site help. And I expect that you'll be surprised at how affordable **Track-It!** is.

Our Satisfied Customers Say It Best...

Doug Williams with Dura-Tech had this to say about **Track-It!**:

"I evaluated 25 products in search of something to help us bring more order and efficiency to our help desk and asset management. I considered everything from \$100,000 packages all the way down to shareware and chose Track-It! Why? Three reasons. First, it offers a lot of bang for the buck. Second, the audit clients feature was key. Third, it is easy to install, easy to use and I can configure it on the fly. I recommend it without hesitation."

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— David Martinelli, Barnes and Noble Booksellers

"We considered many alternatives, but Track-It! was the only single product that met all of our Help Desk and Inventory needs."
— David Rose, United Way

"It helps me to know who has what and what I need to upgrade. I also find the charts, reports and graphics extremely helpful. You did a terrific job on the documentation too. We're very pleased."
— Catherine Slezak, Hewlett-Packard

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strategy than by formal policies, procedures, organizational structures or even the opportunity to work with leading-edge technologies.

2. Do our IT professionals understand how the company and IT organization create value for our end customers? To be truly customer oriented, an organization must be filled with employees who understand the end customers, care about creating value for them and are capable of doing so. Are we providing our IT professionals with the information, skills

Successful organizations where IT professionals enjoy working are not peaceful places.

and resources (time, materials, training, access) that they need to meet customer demands? Are our employees fully engaged and committed to the organization and its goals? Do we understand who our high performers are and what they expect of us?

It is easy to talk about high performers and pay lip service to the concept of listening to them, but it's rare for an organization to be intensely focused on the few genuine stars who design and produce the new systems, connect with key end users and provide exceptional service. A star IT professional can keep 10 or 20 ordinary employees fully productive and focused on the right goals and activities. These are the staff people you must be absolutely certain you don't lose.

3. Do we encourage creativity and innovation, even when it threatens to disrupt the values we believe in? Change and creative destruction are at the core of the economy today, and the source of competitive advantage is creating new value, not just leveraging established approaches. Thus, creativity and innovation are at the heart of business success. You can't afford to assess new ideas in terms of their source or who proposed them; ideas must be allowed to compete on their merits, and organizations must be willing to take risks on untested ideas. To attract and retain good people you have to create a work culture that thrives on innovation and values risk-taking.

4. Have we created a work environment where conflict and passionate disagreement are not only OK, but actively encouraged? Conflict and diversity are at the heart of creativity. In today's fast-paced global economy, the winners will be those companies that invent genuinely new business models and new means of creating value for customers and shareholders. Dissenters and debaters must be encouraged, rewarded and heard. Successful organizations where IT professionals enjoy working are not peaceful places.

5. Do we actively share the company's success with all our

employees? The key is to create a sense of fairness and equity, and to reward real contributions—not just to be nice but to encourage increased effort. The challenge is to create an attractive—even compelling—place to work and to build a sense of common interest in the company's success. Remember that your IT professionals want to feel good about the company; pride in where we work is as important to most of us as financial rewards.

6. Have we created a strong sense of community in which all employees—both full-time and part-time—act and feel as if this is their company? A community in which employees feel and act like owners is an important concept that goes well beyond common thinking about commitment. A deep identity with the organization, and the

willingness to take risks or put in extra effort, is a critical ingredient in high-performing companies. Feeling like part of a community also means that individuals develop strong relationships with their peers, and that they feel included in a social sense as well as a business one. It's much harder to leave an organization that you feel deeply connected to.

7. Are we capturing, sharing and leveraging the knowledge we have built up through our human assets? Do we have a culture and a technology infrastructure that helps employees find the information and knowledge they need from anywhere in the organization? Is there a sense of collective commitment that includes employees helping each other through the sharing of ideas, insights, knowledge and skills? People want to work in an organization that respects their knowledge and encourages two-way sharing.

8. Are we taking full advantage of individual skills and knowledge? There are few things more demotivating than believing you are underused. Individuals want to feel needed and to know they are contributing. But even more important, they want to feel challenged, stretched and developed over time. Employees don't leave an organization that they believe values them, offers them an opportunity to contribute and to grow, and takes advantage of their abilities and experience.

If you address these issues, I guarantee that the IT professionals you need will actually beat down the doors to work with and for you—and it will be a lot more fun for you too. **CIO**

Do you have an opinion you would like to express? Let Senior Editor Megan Santosus know at santosus@cio.com.

James P. Ware is vice president of The Concours Group, a management consulting, research and education company based in Kingwood, Texas.

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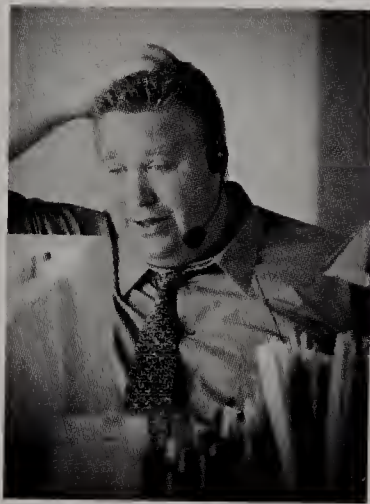
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Long Live the PC



Gary J. Beach

A NASTY NOR'EASTER was forecast for our region. After stacking some wood, my 15-year-old and I headed off to the local video store. *Braveheart* was at the top of our list, and we dashed over to the new releases section of the crowded store only to be disappointed to discover all the copies of *Braveheart* were rented.

Twenty minutes later while wandering through the drama section, my son sneaked up behind me and said, "Look, Dad, I found it!" It was the DVD version of *Braveheart*, and he could see from my tepid response that I was not as thrilled as he with his discovery. "It'll be cool," he assured me. "I'll set up the study like a mini-movie theater, and we'll watch *Braveheart* on our new personal computer," he uttered to himself while we waited to pay for the disc.

Watching a movie on a PC was not among my top 10 list of gotta-do's, but I went along with his scheme. After all, he is the person who turned me on to Napster!

As promised, he rearranged the couch and chair for comfortable viewing on our 19-inch monitor. Ouch, this is going to be a painful experience for my 50-year-old eyes, I thought as I settled back into the chair. The lights dimmed, he booted the computer, and immediately the richness of the sound and the impeccable quality of the DVD on our 1.5GHz computer cap-

tured my undivided attention for nearly three hours that evening—and two the following day.

I was thoroughly impressed. Could this be the killer application the PC was destined to fulfill? While having employees watch movies at work will not improve your productivity ratios, I do believe sight and sound are the personal computer productivity applications that will dramatically transform how business is done in the future.

In December 2000, both Intel and IBM announced plans to increase the power of my 1.5GHz PC tenfold within five to 10 years. That is an awesome amount of processing power. That power, when combined with pervasively deployed bandwidth, will enable groundbreaking video and speech-recognition business applications. Do you really like to fly or sleep in hotel rooms? Ten years from now you will be able to hold face-to-face business meetings with colleagues and customers across the country or around the world by flicking on your personal computer. Now that is productivity!

So, those claiming the death of the PC are wrong. Up to now all the personal computer has done is essentially automate common tasks. In the coming decade this machine will really begin to show us what it can do.

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TRY THIS AT HOME: *Fill a pie pan with an inch of water and float a small piece of cork in it. Next, stroke a needle from the middle to the tip 15 times with a magnet. Lay the needle across the center of the cork and watch as it slowly turns to point north. Congratulations! You've made a compass.*

The first compasses were used in China as early as 200 B.C., derived from the tools of fortune-tellers who divined the future using a spoon made of a magnetic iron ore called lodestone. The handle of the spoon always pointed south. When someone realized that this feature could be used to navigate, not just predict, the magnetic compass was born. The spoon was mounted on a slab marked with the constellations and the cardinal points. The magnetized needle replaced the spoon around the eighth century.

Western Europeans, as usual trailing the Chinese in the arena of invention, adopted the magnetic compass in the 12th century. This was a great improvement over the navigational strategy of following the sun, especially in inclement weather. It's a matter of dispute whether the technology traveled from China to Europe by sea or whether it came via the Silk Road, but its arrival changed the world. Could Columbus or Cortez have found the Americas without it?

The Europeans, to their credit, improved

the device. The English, for example, mounted the needle on a pin in the 13th century. In 1907, American Elmer Sperry invented the gyroscopic compass, which remains level and therefore accurate when in motion, useful on ships and airplanes. Compasses still rule navigation, though today they sport tungsten steel needles, jeweled bearings and other modern fixtures. None of that matters, however, as long as Mother Nature doesn't mess with the location of north.

—Sara Shay



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